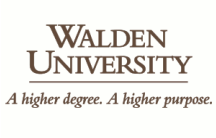

2016

Facilitators and Barriers to Physical Activity Among People With Spinal Cord Injury

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This is to certify that the doctoral dissertation by

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has been found to be complete and satisfactory in all respects,
and that any and all revisions required by
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2015

Abstract

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by

Laura Nicole Richardson-Smith

MA, University of Georgia, 2005

BA, Emory University, 2003

Dissertation Submitted in Partial Fulfillment

of the Requirements for the Degree of

Doctor of Philosophy

Public Health

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Abstract

Research has shown that people with physical disabilities are at risk for developing secondary health conditions. Many of these secondary health conditions may be reduced by engaging in physical activity, yet people with physical disabilities are less likely to participate in physical activity. Information gaps remain regarding facilitators and barriers to physical activity. The purpose of this phenomenological study was to understand the experiences with physical activity among adults with a spinal cord injury (SCI). Research questions asked were about exercise experiences, barriers and facilitators, and the role of the natural and social environment. The theoretical framework used was the theory of planned behavior, in which attitudes and perceived advantages and disadvantages to performing a behavior are considered. In-depth interviews were conducted with 10 adults, 18 years of age and older, who have an SCI that requires the use of a wheelchair. Interviews were transcribed verbatim and analyzed thematically by identifying key phrases, determining recurring phrases, and grouping codes into themes. NVivo, a qualitative software, aided in the analysis. The participants in this study faced many obstacles, including physical and social barriers. Despite these barriers, participants recognized the importance of physical activity and identified factors that encouraged exercise. The implications for positive social change from this research include a better understanding among healthcare professionals working with people with disabilities and disability advocates of the experiences people with an SCI have when exercising and the potential to minimize the barriers to physical activity in an effort to reduce related secondary health conditions.

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Dedication

This dissertation is dedicated to my incredible daughters, Olivia and Gracelyn. You both bring so much joy, laughter, and love to my life. This dissertation is also dedicated to my parents, Earl and Janice. You have always been my biggest supporters. You sacrificed so much for me over the years, and it does not go unnoticed. I am where I am today because of your love and support.

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To my friends and family who supported me over the years, encouraged me, and offered help, thank you for believing in me. Thank you Mark for letting me pursue my academic and career goals these past few years. Now it is your turn!

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Chapter 1: Introduction to the Study

Introduction

In the United States, more than 50 million people reported having some type of disability, either physical or mental (Centers for Disease Control and Prevention [CDC], 2015). People with disabilities represent all backgrounds, races, and socioeconomic status. While at one time disability was only associated with poor health, in recent years, there has been increased awareness that people with disabilities are capable of living healthy lives (Hicks et al., 2003; Krahn, Suzuki, & Horner-Johnson, 2009; Latimer & Ginis, 2005). However, research has shown that people with physical disabilities are at risk for developing secondary health conditions, which are health problems that could be prevented such as obesity, pressure sores, bladder problems, fatigue, and depression (CDC, 2013b; Kinne, Patrick, & Doyle, 2004). Many of these secondary health conditions may be reduced by engaging in physical activity, yet people with physical disabilities are less likely to participate in physical activity compared to people without disabilities (Health and Human Services [HHS] 2000; Kehn & Kroll, 2009; Rimmer, Riley, Wang, Rauworth, & Jurkowski, 2004). Physical disability refers to an impairment that limits motor ability or physical function. In this study, people with spinal cord injury (SCI) are the focus. Increased understanding of the facilitators and barriers to physical activity for people with physical disabilities is necessary to develop appropriate interventions to reduce or prevent secondary health conditions.

Research has shown the health improvements and enhancements to quality of life that physical activity provides, yet despite these proven benefits, large proportions of the

population are physically inactive (Tawashy, Eng, Lin, Tang, & Hung, 2009). The number of people who do not participate in physical activity is even greater among the disability population. The 2009 Behavioral Risk Factor Surveillance System reported the prevalence of physical inactivity in adults with disability to be 22% compared to 10% among adults without a disability (CDC, n.d.).

In this study, I focused specifically on the experiences with physical activity among adults with an SCI. An SCI is a condition that results in damage to the spinal cord and presents signficant motor, sensory, and/or bowel and bladder impairments (Guilcher et al., 2012). The reason I chose to study people with an SCI instead of other types of physical disability is that the preinjury health status of people with an SCI is assumed to be comparable to the general population (Krahn et al., 2009). Prior to injury, people with an SCI had similar opportunities for exercise as compared to the general public (Kehn & Kroll, 2009). Advances in acute care and rehabilitation have also resulted in increased life expectancy for people with an SCI; however, they continue to be at risk for secondary health conditions (Guilcher et al., 2012; Jensen et al., 2012). In addition, SCI has been shown to increase the aging process because of the increased demands on the functioning body systems (Capoor & Stein, 2005). For this reason, in this study I only included participants who have had an SCI for at least 1 year, but no more than 10 years and require the use of a wheelchair.

Secondary health conditions are defined as “highly preventable medical, physical, cognitive, or psychological complications of physical impairment” (Nosek et al., 2008, p. 90). Secondary health conditions are related to adverse outcomes in the health and quality

of life for people with disabilities (Nosek et al., 2008). One common secondary health condition for people with an SCI is heart disease, which is a leading cause of death among people with an SCI (Scelza, Kalpakjian, Zemper, & Tate, 2005). In addition, the sedentary lifestyle of people with an SCI often results in excessive weight gain, and ultimately in obesity (Scelza et al., 2005; Warms, Belza, Mitchell, & Steins, 2004). Obesity is a common secondary health condition for people with physical disabilities including people with an SCI, in part due to barriers to accessing opportunities for physical activity. People with disabilities reported higher rates of obesity than those without disabilities, with 29.1% of women with disabilities being obese compared to 15.3% in women without disabilities. In men with disabilties, the rate was 25.5% compared to 17.7% of men without disabilities (Nosek et al., 2008). Obesity is a contributing factor to many other secondary health conditions including pressure sores, physical inactivity, depression, and fatigue (Liou, Pi-Sunyer, & Laferrere, 2005). The prevention of secondary health conditions should be a major component of health promotion programs and interventions for people with disabilities (Kinne et al., 2004).

The benefits of physical activity among people with an SCI has been increasingly recognized (Hicks et al., 2003; Scelza et al., 2005). Physical activity has been found to improve functional capacity, bone density in upper limbs, endurance, muscle strength, pain, psychological well-being, and reduce stress (Scelza et al., 2005). Despite these benefits of physical activity, there are multiple physical and psychological barriers that prevent people with an SCI from participating in physical activity. Barriers include structural and envirnomental barriers such as lack of ramps, accessible parking spaces,

inaccessible gym equipment, and the unavailability of transportation services (Hwang et al., 2009).

Problem Statement

The risks for secondary health conditions resulting from a lack of physical activity in people with physical disabilities has been noted in the literature, but limited studies are available about why people with physical disabilities do not engage in physical activity (Kehn & Kroll, 2009; Rimmer et al., 2004). Information gaps remain regarding facilitators and barriers to physical activity among people with physical disabilities. In this study, I examined the facilitators and barriers to physical activity among adults with an SCI. Identifying the factors that both facilitate and act as barriers to physical activity among people with an SCI is one important step that may be used to help reduce barriers and facilitate participation in physical activity.

Nature of the Study

For this research I conducted a qualitative phenomenological study with adults, 18 years of age and older who have an SCI that requires the use of a wheelchair. Participants had an SCI for at least 1 year, but no more than 10 years. In addition, all participants had to speak and understand English. The physical ability of a person with an SCI is dependent on the severity of the injury, thus participants in this study had varying abilities and expectations in terms of physical activity level. This study was open to participants with all levels of SCI, including both paraplegia and tetraplegia. Participants were not separated in terms of their level of SCI; however, information about their level of SCI is noted in the analysis. Through in-depth, semistructured interviews with

participants with an SCI, I examined the experiences of and participation in physical activity. The theoretical framework used was the theory of planned behavior.

Research Questions

In this study, I explored the first-hand point of view of the experiences of physical activity in participants with an SCI.

The research questions were as follows:

1. What are the experiences with physical activity among people with an SCI?
2. What are the perceived barriers to physical activity among people with an SCI?
3. What are the perceived facilitators to physical activity among people with an SCI?
4. What role does the natural and social environment have in the level of physical activity among people with an SCI?

Purpose of the Study

The purpose of this study was to understand the study participants' experiences with physical activity, including the barriers and facilitators to participation. The knowledge gained from this study adds to the growing body of literature associated with health promotion programs for people with physical disabilities.

Phenomenology

In this phenomonological research study, I explored the lived experiences of people with an SCI as it relates to physical activity participation. Phenomenology was developed by Husserl in 1913 and provides an explanation for how people give meanings

to their everyday lives (Reeves, Albert, Kuer, & Hodges, 2008). Phenomenology involves a return to the experiences in an effort to provide comprehensive descriptions which serve as the basis for an analysis (Moustakas, 1994). Using a first-person point of view, this methodology explores how people make sense of the world. Phenomenology provides accounts of the experiences of an individual (Reeves et al., 2008). For this study, I examined the involvement in physical activity experienced by people with an SCI.

Theoretical Framework

The theory of planned behavior is one of the most widely used theoretical frameworks for examining determinants of physical activity (Latimer & Ginis, 2005). This theory has also been successfully applied to studies involving people with an SCI (Kehn & Kroll, 2009). In the theory of planned behavior, a person's intentions and behaviors are based on three determinants: those personal in nature, those reflecting social influence, and those dealing with control issues (Ajzen, 2005). Specifically, the personal factor refers to a person's attitudes toward the behavior. The person's attitude is either positive or negative to performing the behavior (Ajzen, 2005). Another determinent of intention is the person's perceptions of the social pressure to either perform or not perform the behavior by people significant to them (Ajzen, 2005). The third determinant relates to self efficacy or the ability of the person to perform the behavior (Ajzen, 2005).

With the theory of planned behavior, attitudes and the perceived advantages and disadvantages to performing a behavior are considered (Latimer & Ginis, 2005). In this

study, I used the constructs of the theory of planned behavior to develop interview questions. Participants were asked questions related to attitudes about physical activity, motivation and perceptions about physical activity, influences and perceptions from others about physical activity, and their ability to perform physical activity. Perceived behavior controls were reflected by perceptions of inaccessible facilities or positive experiences with exercise options (Kehn & Kroll, 2009; Latimer & Ginis, 2005). Subjective norms were reflected by a lack of encouragement from loved ones to participate in physical activity (Latimer & Ginis, 2005).

Operational Definitions

Barrier: Anything that limits physical activity (Rimmer et al., 2004).

Facilitator: Anything that encourages physical activity (Rimmer et al., 2004).

Natural environment: Barriers or facilitators to physical activity that relate to the built or natural environment, such as facilities, equipment, and transportation (Rimmer et al., 2004).

Paraplegia: A type of paralysis that results in a loss of sensation or movement, to some degree, in the legs, bowel, and bladder (Reeve Foundation, n.d.).

Physical activity: Adults with disabilities should consult with their healthcare provider regarding the amounts and types of physical activity that are appropriate for their abilities. In general, the *Physical Activity Guidelines for Americans* recommends at least 2 hours and 30 minutes of moderate-intensity activity each week, along with muscle-strengthening activities 2 or more days each week for adults with a disability

(HHS, 2008). In this study, the level of physical activity varied among participants depending on the severity of their spinal injury.

Secondary health conditions: "Highly preventable medical, physical, cognitive, or psychological complications" (Nosek et al., 2008, p. 90).

Spinal cord injury (SCI): A condition that results in damage to the spinal cord and presents signficant motor, sensory, and/or bowel and bladder impairments (Guilcher et al., 2012).

Social environment: The social setting and culture created by both people with disabilities and those without disabilities. Perceptions and attitudes including stigma, discrimination, fear, feeling self-conscious, and lack of support are components of the social environment (Rimmer et al., 2004).

Tetraplegia: Also referred to as quadriplegia, this type of paralysis results in a loss of sensation or movement, to some degree, in all four limbs (Reeve Foundation, n.d.).

Limitations

Phenomenological research has several limitations. Limitations to this study are that the conclusions were dependant on the participants recruited for the study. Phenomenology does not focus on wide generalizations, but rather focuses on the individual experience (Reeves et al., 2008). The information that was provided by the participants in this study was self-reported. The participants may not have provided completely accurate or thorough responses, and the responses dependeded on their level of comfort in discussing the topic.

Delimitations

Due to the nature of phenomoenological studies, the sample size in this study was small; thus, it is not possible to know if the results were typical. Participants in this study were adults, 18 years of age and older, had an SCI for at least 1 year, but no more than 10 years, and used a wheelchair. Participants were required to speak and understand English. Results cannot be generalized to other people with an SCI.

Significance of the Study

This study added to the body of knowledge related to physical activity among people with physical disabilities. Research has shown that people with disabilities engage in physical activity less than people without disabilities (CDC, n.d.; HHS, 2000). When developing new health promotion strategies, a better understanding of the experiences of people with physical disabilities as it relates to facilitators and barriers to physical activity is necessary. The results from this study assists in providing an in-depth understanding of the individual phenomenon of having an SCI and engaging in physical activity. The positive social change from this research results from increased knowledge and understanding of perceived barriers and facilitators to physical activity among people with an SCI. This knowledge may assist community leaders in creating appropriate infrastructure and programs and encourage development of secondary health condition prevention measures. Additionally, this research brought greater awareness to the challenges to physical activity among people with an SCI. The research presented provides newfound insight into the lives of people with an SCI as it relates to achieving physical activity. Communities, health care professionals, and organizations should

consider the results from this research when developing physical activity programs and promoting physical activity among this population.

Summary

People with disabilities encounter social, economic, and medical disadvantages and, although this group is at risk for developing secondary health conditions, many of these problems may be prevented or reduced with appropriate interventions. A lack of physical activity has been shown to result in the development of secondary health conditions and has a significant influence on self-reported quality of life. A better understanding of physical activity experienced by people with an SCI will assist in reducing the barriers to physical activity among this population. In this study, I explored the experiences of people with an SCI as it relates to physical activity to better understand the perceived barriers and facilitators. I conducted in-depth interviews with study participants. Chapter 2 provides a description of available literature on secondary health conditions experienced by people with physical disabilities, including people with an SCI, barriers and facilitators to physical activity, and the impact of physical activity programs. In Chapter 3, I describe the design and methodology used in this study. In Chapter 4, I have detailed the outcomes of the analysis. In Chapter 5, I summarize the outcomes from the study and provide a discussion of how this research can be applied to practice.

Chapter 2: Literature Review

Introduction

People with physical disabilities are at risk for developing secondary health conditions. Many of these conditions can be prevented or reduced with appropriate interventions. Common secondary health conditions impacting people with physical disabilities include obesity, pressure sores, bladder problems, fatigue, and depression (CDC, 2013b; Kinne et al., 2004). Engaging in physical activity may reduce many of these health conditions (Kehn & Kroll, 2009; Rimmer et al., 2004). There is a need to better understand the potential barriers and facilitators to physical activity for people with physical disabilities. Understanding the reasons behind why people with physical disabilities either choose to participate in physical activity or choose not to is necessary in order to develop appropriate interventions (Rimmer et al., 2004). The purpose of this chapter is to explore the body of knowledge available on the secondary health conditions impacting people with physical disabilities and the barriers and facilitators to achieving physical activity.

This literature review includes an examination of research on secondary health conditions experienced by people with physical disabilities related to a lack of physical activity and provides a better understanding of their experiences with physical activity, including the barriers and facilitators. The impact of physical activity programs on this population is reviewed in relation to self-reported quality of life and the reduction of secondary health conditions. The focus of this study is on helping others understand the experiences of people with an SCI as it relates to physical activity.

Research Strategy

The literature review was conducted using several sources of information. Google Scholar searches included the phrase *physical activity amount people with physical disabilities*. Another phrase used included *secondary health conditions for people with physical disabilities*. Within these searches, other key terms included *spinal cord injury*, *physical activity, leisure activity*, *barriers to exercise*, and *disability.* References from the research were reviewed and additional peer-reviewed literature was examined from this cross-reference. The CDC's online library, Public Health Library and Information Center, provided the majority of the articles used for this review. Walden University's online library MEDLINE and CINAHL Plus databases provided additional articles included in the literature review. The majority of the information collected for the literature review section came from peer-reviewed journals; however, government websites were used to clarify information. While some of the sources in the literature review are over five years old, the articles included remain the most critical and up-to-date on the topic.

Research Problem

The following literature review provides insight into secondary health conditions experienced by people with physical disabilities as these conditions relate to physical activity. In recent years, there has been increased attention placed on the promotion of health in people with disabilities. While health was traditionally defined as not having an illness, there has been a shift in defining health in recent years (Becker, 2006). For people with disabilities, health has another definition. In 2001, the General Assembly of the World Health Organization (WHO) adopted the International Classification of

Functioning, Disability, and Health (WHO, 2013). Within this classification, disability is separated from health status, thus allowing someone with a disability to be classified as healthy (WHO, 2013). This classification also placed increased emphasis on the role of the environment in the challenges faced by people with disabilities that may prevent them from being healthy (Becker, 2006; WHO, 2013). Because people with disabilities face additional challenges and are at increased risk for developing secondary health conditions, there is an even greater need for health promotion in this population (Becker, 2006).

Secondary Health Conditions

The concept of secondary health conditions for people with disabilities was first identified in the Institute of Medicine's 1991 report *Disability in America* (Turk, 2005). In this report, secondary conditions were defined and research was conducted by the National Center for Medical Rehabilitation Research and CDC to identify the secondary conditions found by people with disabilities (Turk, 2005). Secondary health conditions are a result of acquired lifestyle changes and are also related to negative outcomes in the quality of life and health (Nosek et al., 2008; Rimmer & Rowland, 2008). Prevention efforts of secondary conditions depend on many factors, including the underlying primary condition (Turk, 2005). A secondary health condition has the potential to require medical attention in addition to the care related to the primary disability, complicate daily routines, and increase the need for additional support services (Turk, 2005).

As Santiago and Coyle (2005) noted, while some secondary health conditions are a result of the primary disability, others are a result of lifestyle, behavior, and the

environment. In particular, secondary conditions are often exacerbated by a sedentary lifestyle, which is common for many people with physical disabilities (Ipsen, 2006). As such, some of these secondary conditions can be prevented or managed by adopting healthy lifestyles, which include participating in regular physical activity (Santiago & Coyle, 2005). Preventing secondary health conditions should be included in health promotion programs for people with physical disabilities (Kinne et al., 2004). However, the development and implementation of health programs requires an understanding of the individual's risk factors and the natural and social barriers. Health promotion programs do not usually address the unique needs of people with disabilities (Ipsen, 2006). There are often access issues to exercise and medical equipment, and fitness personnel are not often trained to work with people with disabilities (Ipsen, 2006). Unfortunately, the connection between health and people with disabilities is not a common visualization. Health clubs and recreational facilities do not often show images of people with disabilities exercising. Seldom do private and public health facilities advertise services for people with disabilities, even though some facilities offer discounted rates for people with disabilities (Rimmer, 2005). As Kinne et al. (2004) noted, access to services along with opportunities to participate in activities might be just as essential to a person's health as medical interventions.

Obesity as a Secondary Health Conditions

People with physical disabilities have a more difficult time participating in health promoting activities, such as regular exercise, compared to the general public. One of the common complications that results from a lack of physical activity is obesity. Just as

obesity is a growing problem in the general population, obesity is also a serious concern among people with physical disabilities (Liou et al., 2005). The prevalence of obesity for people with disabilities is even more alarming (Rimmer & Rowland, 2008). Among people with disabilities, 24.9% were obese compared to 15.1% of people without disabilities (Nosek et al., 2008). Of the secondary health conditions common in people with physical disabilities, obesity is often ignored compared to other more acute conditions (Liou et al., 2005). Unfortunately, obesity is a contributing factor to many of the other secondary health conditions that people with physical disabilities experience, including pressure sores, physical inactivity, depression, and fatigue. Each of these conditions also impact daily activities (Liou et al., 2005). For people with physical disabilities "obesity is doubly disturbing" (Liou et al., 2005, p. 321) since obesity is not only linked to increasing chronic conditions, but it also may limit a person's physical activity and participation in social and community activities. In addition, obesity makes transfers from wheelchairs more difficult and interferes with people's ability to care for themselves, ultimately diminishing their quality of life (Liou et al., 2005; Rimmer & Rowland, 2008).

Factors that contribute to obesity in people with physical disabilities include changes in body composition and energy metabolism, muscle atrophy, and physical inactivity (Nosek et al., 2008). People with an SCI have a three to five fold higher risk to develop Type 2 diabetes, which is associated with increased fat mass (Nosek et al., 2008). There is also evidence of increased risk for coronary heart disease in people with an SCI.

Obesity and being immobile increases the risk factors for developing coronary heart disease (Liou et al., 2005).

Depression and Fatigue and Physical Inactivity

As well as increasing the chances for obesity and other physical conditions, physical inactivity may contribute to other secondary health conditions, such as depression and fatigue. As Nosek et al. (2004) noted, mental health and physical health are intrinsically linked. Participants in the study by Nosek et al. acknowledged the close association between an active mental state and maintaining wellness. Participants noted that participating in physical activity reduced their stress levels. Participants who did not exercise mentioned that they became more fatigued when they did not participate in physical activity (Nosek et al., 2004).

The purpose of the study by Tawashy et al. (2009) was to determine the relationship between participation in physical activity and secondary complications including pain, fatigue, and depression. In this cross-sectional design study, participants included adults with an SCI who used a manual wheelchair. Participants completed a physical activity recall assessment (Tawashy et al., 2009). The results from this study showed that greater physical activity levels were associated with less secondary complications including pain, fatigue, and depression (Tawashy et al., 2009). However, the results from the study also revealed that secondary complications, such as pain and fatigue, remain barriers to physical activity participation, while self-efficacy was shown as a facilitator to participation (Tawashy et al., 2009).

Physical Activity Among Specific Groups

Physical activity is considered a key public health objective and leading health indicator; however, researchers have found that people with disabilities are less likely to be physically active compared to the general population (CDC, n.d.). In addition, men with physical disabilities are more likely than women with physical disabilities to participate in physical activity (Santiago & Coyle, 2004). Given the disparity in physical activity levels in women compared to men with physical disabilities, multiple studies have focused specifically on women. In the United States, women with disabilities are considered one of the most disadvantaged populations (Nosek & Hughes, 2003; Thierry, 1998). As Nosek et al. (2004) explained, women with physical disabilities encounter challenges in maintaining their physical, psychological, and social health and are at increased risk of developing secondary health conditions.

There is a major health disparity between women with disabilities and women without disabilities in being obese or overweight (Nosek et al., 2008). Nosek et al. (2004) studied the concepts of health and wellness in women with disabilities. From their qualitative study, several themes emerged. The participants acknowledged the influence of their mental state and attitudes in promoting and maintaining health and wellness. Participants noted that if they felt good mentally, this contributed positively to their health and their desire to be more physically healthy (Nosek et al., 2004). Additionally, health and wellness were impacted by the presence or absence of social support from others. Participants stated that stress came from other sources, such as the attitudes of family and health professionals, specifically when family members did not understand the

participant's disability (Nosek et al., 2004). The participants also expressed their frustration with the medical profession and interactions with health professionals (Nosek et al., 2004). Participants mentioned challenges in finding medical practitioners who were knowledgeable about how their disability affected health maintenance (Nosek et al., 2004).

Discussions with participants about exercise revealed that the definition of exercise or physical activity varied in terms of the participants' physical limitations (Nosek et al., 2004). For those participants with more limited mobility, exercise was defined as something accomplished during routine daily activities, such as housework, cooking, and running errands (Nosek et al., 2004). One aspect of exercise all participants noted was that engaging in physical activity involved a greater sacrifice for women with physical disabilities compared to the general public. Additionally, the consequences of not engaging in physical activity may be more severe for this group (Nosek et al., 2004). For instance, some participants noted that when they did not exercise, it exacerbated other health conditions as well as increased sluggishness and fatigue (Nosek et al., 2004). The results from this study provided insight into how women with disabilities perceived health and wellness (Nosek et al., 2004).

In another study focused on women with disabilities, Nosek, Hughes, Robinson-Whelen, Taylor, and Howland (2006) examined the health behaviors of women with physical disabilities, including their physical activity level and nutritional behaviors. As Nosek et al. (2006) noted, despite the vast amount of awareness and trends in dieting for women in general, women with physical disabilities have less information available to

them regarding how nutrition may improve or worsen their disability. Challenges in shopping and preparing foods also may complicate the ability to follow recommended diets, and limitations in physical activity may result in problems managing weight (Nosek et al., 2006).

In addition to barriers in the natural and built environment, women with physical disabilities encounter socioeconomic barriers. The study by Nosek et al. (2006) included a self-administered questionnaire for women with a physical disability or a condition that limited mobility or self-care. The results from the study found that those women who had lived with their disability longer or those who experienced greater pain reported less physical activity. Those participants who had better mobility and greater self-efficacy for nutrition had better overall nutritional behaviors compared to those who needed more assistance with daily activities (Nosek et al., 2006).

Similar to how women with disabilities have a unique set of challenges, other subsets of the disability population also have been studied to determine their specific needs as it relates to health promotion. Hogan et al. (2000) looked specifically at the health promotion needs of young people with disabilities. This study included 3,918 students, and 288 of these participants identified themselves as having a disability (Hogan et al., 2000). Participants with a disability reported poorer health and social outcomes compared to other participants. While participants with disabilities did report similar rates of physical activity compared to other students, they also reported higher levels of sedentary activities (Hogan et al., 2000). These sedentary activities may place

these students with disabilities at a higher risk for secondary health conditions such as obesity (Hogan et al., 2000).

Piotrowski and Snell (2007) also addressed the unique challenges for adolescents with disabilities and noted that this population does not have an interest in learning about secondary conditions that may occur with aging or how to prevent these conditions. However, as Piotrowski and Snell mentioned, it is essential that adolescents with disabilities be given this health information since these secondary conditions may occur at a younger age because of their disabilities. The authors noted the benefits of encouraging adolescents to develop a personal definition of health and wellness and to participate in health activities that lower the risk of developing secondary health conditions (Piotrowski & Snell, 2007).

Barriers to Physical Activity in the Natural Environment

Many people with disabilities fail to integrate regular physical activity into their routines (Rimmer et al., 2004). Understanding the barriers and facilitators to participation may provide useful information when developing interventions (Rimmer et al., 2004). In people with physical disabilities, the level of physical inactivity is linked to the severity of the disability (Durstine et al., 2000; Rimmer, 2005). Rimmer et al. (2004) sought to add to the published literature on barriers and facilitators to physical activity among people with disabilities. Rimmer et al. conducted a series of focus group sessions with people with physical disabilities and professionals associated with fitness and recreation design, fitness and recreation professionals, and architects. Through this research,

Rimmer et al. determined that there were multiple personal and environmental factors that determined access and participation in physical activity.

Major categories of barriers and facilitators determined from this study included the built and natural environment; cost and economics; equipment; guidelines, codes, regulations, and laws; information; emotional and psychological; knowledge, education, and training; perceptions and attitudes; policies and procedures; and resource availability (Rimmer et al., 2004). Specifically, the participants found the natural environment to be inherently inaccessible, with narrow doorways, inaccessible access routes, front desks too high, lack of elevators, and a lack of curb cuts (Rimmer et al., 2004). To address these barriers, suggestions included nonslip mats in locker rooms, accessible parking spaces, the installation of push-button doors, and zero-depth entry pools. One of the most frequent suggestions by participants was the provision of family changing rooms, which would be useful, both for families with a disabled member and for those who needed a personal assistant. Participants were in agreement that by developing a more accessible built environment, it would benefit all facility members, including those with disabilities and older adults (Rimmer et al., 2004). The most frequently mentioned barriers to physical activity were lack of transportation and accessible facilities, especially in rural areas (Rimmer et al., 2004). The results from this study helped identify the need for a reliable assessment instrument to measure the personal and environmental factors related to physical activity participation in order to identify specific accessibility issues for a facility or program (Rimmer et al., 2004).

Similarly, Spivock, Gauvin, Riva, and Brodeur (2008) examined the natural environment of people with disabilities as it related to physical activity. Spivock et al. studied the environmental buoys in neighborhoods. Environmental buoys are defined as an element of the environment that supports a person's activities, even if that person has physical limitations (Spivock et al., 2008). These buoys included walking surfaces, adaptation of signage, and accessibility of elements around the walking area (Spivock et al., 2008). The results from the study found that people with disabilities who lived in neighborhoods with active living buoys were more likely to report involvement in physical and leisure time activities (Spivock et al., 2008).

Kehn and Kroll's (2009) study also examined the barriers and facilitators to exercise participation for people with an SCI. Participants included 15 self-described "exercisers" and 11 "non exercisers" with an SCI. The researchers conducted phone interviews to determine exercise pre and post injury, and the barriers and facilitators to physical activity (Kehn & Kroll, 2009). Participants consistently noted lack of accessibility as barriers, including inaccessible facilities (Kehn & Kroll, 2009). These accessibility concerns were even more prevalent for participants in rural areas (Kehn & Kroll, 2009). Nosek et al.'s (2004) also noted these environmental factors that resulted in barriers to physical activity among study participants. Elements to the built environment were mentioned, including inaccessible medical facilities and equipment and the lack of accessible exercise and recreation facilities. Additional barriers to physical activity among people with an SCI are discussed in the Barriers and Facilitators for People with Spinal Cord Injury section.

Social Barriers to Physical Activity

Not only do natural environmental barriers inhibit exercise in people with physical disabilities, but people with physical disabilities also encounter social barriers. Social barriers may also prevent people with disabilities from achieving physical activity. Rimmer et al.'s (2004) study on barriers and facilitators to physical activity revealed that one barrier for participants was the lack of knowledge about the community's accessible facilities and programs. Emotional and psychological barriers included the perception that recreation facilities were unfriendly environments. Participants with physical disabilities also stated that they felt self-conscious at a health facility, had fear of the unknown, and fear of failure (Rimmer et al., 2004).

Research has shown that people with physical disabilities also encounter "invisible barriers" (Goreczny, Bender, Caruso, & Feinstein, 2011, p. 1596). These invisible barriers include negative attitudes toward people with disabilities, which may reduce the chances for successful integration into the community. Negative attitudes impact the self-concept, self-esteem, perception of the disability, and use of vocational and rehabilitation services of a person with a disability (Goreczny et al., 2011). Goreczny et al. examined attitudes of a group of 129 people attending a conference that was aimed at improving quality of life for people with disabilities. While previous research found that people with disabilities experienced negative attitudes and stereotypes, the results from Goreczny et al.'s study indicated that attitudes are changing. The findings showed that, overall, the attitudes towards people with disabilities were positive, especially as they related to legal rights, competency, and capability to perform daily living activities.

This study was significant since attitudes often predispose action and influence behaviors (Goreczny et al., 2011).

While multiple researchers have examined the various reasons why people with physical disabilities do not exercise, Cardinal, Kosma, and McCubbin (2004) sought to determine the behavioral strategies that encourage and support exercise. The authors used the transtheoretical model (TMM) of behavior change to analyze questionnaire results from a national cross-sectional survey of adults with physical disabilities. Participants in the precontemplation stage revealed minimal use of the behavioral and cognitive processes of change, had low self-efficacy, and perceived few pros and high cons for exercise. Participants in the contemplation phase reported higher self-efficacy scores, but also reported high-perceived cons and barriers for exercise. Participants in the preparation stage reported more pros than cons to exercise. Barriers were not as high compared to previous stages. In the action stage, self-efficacy continued to increase, pros slightly outweighed the cons, and barriers remained stable when compared to those in the preparation stage. Participants in the maintenance stage also had improved self-efficacy and there were more pros than cons for exercise. In this stage, barriers to exercise were the lowest compared to the other stages (Cardinal et al., 2004). The results of this study were in agreement with existing evidence among populations without disabilities, thus providing further support for using the TMM as it relates to exercise barriers in the disability community (Cardinal et al., 2004). Additional literature regarding social barriers is discussed in the Barriers and Facilitators for People With Spinal Cord Injury section.

Spinal Cord Injury

SCI is one type of physical disability. SCI refers to damage of the spinal cord, which results in a loss of motor or sensory function (Buchholz et al., 2009). The life expectancy for people with an SCI is approaching that of the able-bodied population, which has resulted in a shift in rehabilitation goals from one of extension of life expectancy to the increase in independence and quality of life (Hicks et al., 2003; Kehn & Kroll, 2009; Scelza et al., 2005). People with an SCI are susceptible to secondary health conditions, such as obesity, pressure ulcers, and depression (Kehn & Kroll, 2009). Past studies have also shown that people with an SCI are susceptible to urinary tract infections, diabetes, cardiovascular disease, osteoporosis, and arthritis and that physical activity can help improve these conditions, enhance functional abilities, as well as increase social integration and quality of life (Kehn & Kroll, 2009). Unfortunately, achieving a physically active lifestyle remains a challenge for people with an SCI (Kehn & Kroll, 2009).

After an SCI, many people either stop or reduce participation in physical activity (Tasiemski, Bergstrom, Savic, & Gardner, 2000). Since most people with an SCI are sedentary, there is a need for programs to promote physical activity (Latimer, Ginis, & Arbour, 2006). People with locomotor disabilities are often caught in "a cycle of deconditioning" (Warms et al., 2004, p. 288), which refers to the deterioration of physical function from inactivity, leading to even more of a reduction in the level of physical activity. One study by Latimer, Ginis, Craven, and Hicks (2006) even found that people with an SCI spend less than 2% of their time engaging in leisure time physical activity.

The benefits of regular physical activity have been increasingly recognized, especially as they relate to gaining independence and improving quality of life (Hicks et al., 2003). Research has identified the positive effects of regular physical activity in many populations as this relates to pain, depression, self-concept and quality of life (Hicks et al., 2003). People with an SCI who participated in structured exercise programs reported an increase in quality of life, energy, self-confidence, and body image (Kehn & Kroll, 2009). Given the increased life expectancy in people with an SCI, it is imperative to determine how this population can improve their quality of life (Hicks et al., 2003). Quality of life factors in this population include psychological well-being, pain, mobility, and the ability to perform daily living activities (Hicks et al., 2003).

People with an SCI are at increased risk for common conditions such as diabetes and heart disease, and these conditions often present at an earlier age compared to people without an SCI (Hicks et al., 2003; Manns & May, 2007). The association between heart disease and its modifiable risk factors, such as physical inactivity, has been recognized (Hicks et al., 2003). In the general population, epidemiological evidence suggests that leisure time physical activity is associated with a 30-50% reduction in the risk of cardiovascular disease and Type 2 diabetes (Bassuk & Mason, 2005). Buchholz et al. (2009) sought to determine if this reduction in risk also held true for people with an SCI. The authors examined the relationship between leisure time physical activity and common risk factors for cardiovascular disease and Type 2 diabetes among people with an SCI (Buchholz et al., 2009). The results from this study found that body mass index, percentage of fat mass, insulin resistance, and C-reactive protein were lower in people

who were active and participated in at least 25 minutes of mild to moderate leisure time physical activity each day compared to people who do not engage in leisure time physical activity (Buchholz et al., 2009). Despite the health benefits shown in those who participated in physical activity compared to those who do not participate, the authors were unable to determine if these differences resulted in reduced levels of diabetes or cardiovascular disease (Buchholz et al., 2009).

The management of secondary conditions in people with an SCI is ongoing; however, the patient education process often occurs during rehabilitation. As Manns and May (2007) explained, this presents challenges as people with a new SCI may not recognize the importance of preventing secondary health conditions as they are focused on the physical and psychological changes associated with the injury. It is during the initial rehabilitation phase that the person has the most access to knowledgeable SCI experts. In an effort to make the best use of these resources, rehabilitation services should include ongoing access to experts and provide resources for people newly diagnosed with an SCI (Manns & May, 2007).

Barriers and Facilitators for People With Spinal Cord Injury

Promoting physical activity among people with an SCI remains a priority, but is not without challenges. Scelza et al. (2005) conducted a cross-sectional study to identify the barriers to physical activity faced by people with an SCI. The study included 72 participants who had an SCI and found that, while 73.6% of the participants expressed interest in exercising, only 45.8% actively participated in an exercise program (Scelza et al., 2005). In addition, less than half of the participants reported that their doctor had

advised them to exercise and participate in an exercise program (Scelza et al., 2005). Three types of barriers were determined: intrapersonal or intrinsic, such as lack of energy or motivation or interest; resources which included the costs associated with exercise programs, or a lack of knowledge of where to exercise; and structural or architectural which included the accessibility of programs or knowledgeable instructors (Scelza et al., 2005). One third of respondents noted that exercise was boring, that they did not know how to exercise, or they were too lazy (Scelza et al., 2005). The majority of participants indicated they would like to participate in a type of exercise program; however, less than half of those participants were currently participating in an exercise program (Scelza et al., 2005). There was not one perceived barrier that stood out more than others. However, one surprising result was that the transportation barrier, including availability and cost, which is one of the most cited barriers in literature was not mentioned as much by participants in this study (Scelza et al., 2005). The authors speculated that this may have been because the participants lived in a relatively affluent region with existing community resources (Scelza et al., 2005). Findings also showed that participants expressed concerns over a lack of experience among fitness staff to meet the needs of people with disabilities. Poor accessibility, lack of privacy, and fear of injury were other barriers noted in the study (Scelza et al., 2005). These particular findings were similar to what has been found in other studies conducted about barriers to physical activity (Cardinal et al., 2004; Rimmer et al., 2004; Scelza et al., 2005).

Whiteneck et al. (2004) also examined the barriers to participation in activity for people with an SCI. They focused on the impact of environmental barriers and compared

the impact of environmental barriers to demographic and injury characteristics and activity limitations in predicting participation and life satisfaction. Whiteneck et al. used the Craig Handicap Assessment and Reporting Technique (CHIEF) to determine the main environmental barriers reported by people with an SCI. CHIEF is a 25-item instrument that quantifies the frequency, magnitude, and overall impact of perceived environmental barriers (Whiteneck et al., 2004). In this study, environmental barriers referred to barriers that kept people with disabilities from functioning within the household and community and kept them from doing what they needed or wanted to do (Whiteneck et al., 2004). These environmental barriers included social, attitudinal, and policy barriers, along with physical and architectural barriers (Whiteneck et al., 2004). The study results revealed that the main barriers included the natural environment such as the physical and structural surroundings, followed by other barriers including transportation, help at home, health care, and government policies (Whiteneck et al., 2004). In addition, the results showed significant differences based on age at injury and gender. For instance, the oldest and youngest age groups at injury reported the least amount of environmental barriers. Women reported more barriers as did minorities (Whiteneck et al., 2004). The authors suggested a reason for this disparity was that women and minorities may experience additional social exclusion and encounter more physical barriers compared to other groups (Whiteneck et al., 2004).

Much of the existing research on exercise among people with an SCI has been focused in a controlled setting, through a structured exercise program or related to discharge from rehabilitation (Kehn & Kroll, 2009). In contrast, Kehn and Kroll used a

qualitative-exploratory design and focused as much on facilitators to physical activity as the barriers in their study. Just as it is important to understand barriers to physical activity, understanding the factors that encourage physical activity is crucial so health professionals may tailor interventions and programs adequately (Kehn & Kroll, 2009). The authors conducted a semi-structured interview with 26 participants that focused on experiences with exercise before and after injury, exercise regimen logistics, barriers and facilitators to exercise, perceived benefits of exercise, perceived impact on secondary health conditions, experiences with pain management, and future exercise plans (Kehn & Kroll, 2009). While qualitative studies such as this one do not allow for the findings to be generalized to a larger population, the participants for this study were randomly chosen from a sub-set of a larger survey study (Kehn & Kroll, 2009). From these interviews, the authors found that motivation or a lack of motivation was a major factor in determining physical activity level (Kehn & Kroll, 2009). For example, one of the most commonly reported barriers to exercising was the perceived limited return on investment to exercise, referring to the amount of time and energy needed to achieve benefits from the exercise. Participants noted that the amount of time and energy needed to achieve benefits was unrealistic, too demanding, or failed to provide motivation (Kehn & Kroll, 2009). A common reported facilitator to exercise was the perceived impact of exercise on participants' psychological well-being and mental health. Participants perceived exercise to reduce depressed mood, manage stress, control pain, and provide discipline and structure (Kehn & Kroll, 2009).

Participants also identified socio-economic barriers and facilitators. Non-exercisers noted barriers that prevented them from exercise, even when motivated. These barriers included a lack of knowledge and resources, lack of accessibility including facilities or travel to facilities, lack of personal assistance, and lack of social support (Kehn & Kroll, 2009). Kehn and Kroll found that, despite the motivation to exercise, people with an SCI encountered multiple obstacles. To enhance physical activity and reduce secondary health conditions in people with an SCI, there needs to be a focus on removing barriers as well as promoting facilitating factors (Kehn & Kroll, 2009).

Increasingly, evidence suggests that while people with an SCI have intentions for physical activity, the follow through is not as strong (Latimer et al., 2006). Part of the reason is due to behavioral and activity barriers. Latimer et al. evaluated the efficacy of an eight-week intention intervention for promoting physical activity among people with an SCI through a randomized clinical trial. In this study, participants formulated implementation intentions over the phone with the assistance of an interventionist. During this call the participants scheduled three, 30-minute physical activity sessions per week for four weeks. The plan specified where and when they planned to exercise along with the type, intensity, and duration (Latimer et al., 2006). Participants received emailed calendars with their intentions and a physical activity log book. Participants received follow up calls from the interventionist (Latimer et al., 2006). Participants who formed implementation intentions followed through with their physical activity intentions and engaged in more physical activity compared to participants in the control group. The findings from this study indicated that formulating implementation intentions strengthens

the intention-behavior relationship and increases physical activity (Latimer et al., 2006). In addition, implementation intentions increased perceptions of control, and resulted in people viewing their goal attainment in a more positive light (Latimer et al., 2006).

Despite the barriers that people with an SCI face, some people do adopt a physically active lifestyle (Tawashy et al., 2009). Tawashy et al. evaluated the intensity level and nature of physical activity of people with an SCI. The results from this prospective cross-sectional study found that approximately 50% of the reported physical activity for this population was from daily living activities, such as personal hygiene, household chores, and work-related activities. Higher intensity activity related to lower levels of pain and fatigue and higher levels of self-efficacy. Higher amounts of mild intensity activity related to less symptoms of depression (Tawashy et al., 2009).

Levins, Redenbach, and Dyck (2004) also studied people with an SCI who participated in physical activity. Specifically, Levins et al. explored the experiences that people with an SCI had with participation in physical activity. Participants included 8 adults who ranged from active to inactive. The authors conducted in-depth, semi-structured interviews to examine barriers and enablers to participation in physical activity (Levins et al., 2004). Instead of focusing solely on the meaning of the phenomena, the authors guided the interview using ethnographic principles that focused on what people do, as well as how people interpret their experiences and actions (Levins et al., 2004). The primary author conducted the interviews and probed for issues that participants experienced that acted as barriers or facilitators to physical activity (Levins et al., 2004). The authors determined interview questions based on review of the existing literatures

and the authors' clinical and personal experiences (Levins et al., 2004). However, each interview was shaped by the responses from the participant and the interviewer allowed the participant to shape the format of the interviews (Levins et al., 2004). Interviews were conducted in the setting chosen by the participant (Levins et al., 2004).

In the study by Levins et al. (2004), physical activity ranged from participation in sports to informal or unstructured physical activity for exercise or pleasure. From the interviews, the two main themes that emerged were individual influences and societal influences. Individual influences refer to the loss of an able identity and redefining self. Societal influences refer to environmental and attitudinal barriers, such as physical access and access to information and resources. The loss of activities, whether perceived or real, played a significant role in the participants' adjustment. This period of adjustment often resulted in physical activity being put on hold. The majority of participants associated physical activity with their former selves prior to their injuries. While physical activity was nonexistent in the beginning of their adjustment, all participants noted the pivotal role physical activity eventually played in reestablishing their lives after injury.

Participants also affirmed that the barriers and enablers to physical activity included the environment and societal attitudes. Each noted the impact of the physical and social environment on physical activity. For instance, participants mentioned that they needed more than just an accessible door into a fitness center. Other resources such as equipment, funding, knowledge of resources, instruction, and organization were necessary (Levins et al., 2004). Even with the motivation to exercise, participants noted the barriers to achieving physical activity. Societal attitudes influenced the participants'

integration into physical activities. Participants mentioned that the actions and attitudes of others affected their participation, especially when others discounted or underestimated their abilities (Levins et al., 2004). A heightened sense of self-awareness and vulnerability also contributed to a lack of participation in physical activity (Levins et al., 2004). Participants said they felt embarrassed and self-conscious when participating in physical activities among able-bodied people (Levins et al., 2004). However, participants also noted societal attitudes as enablers to physical activity. Family and friends became supportive of physical activity and others saw physical activity as a way to spend more time with friends and family (Levins et al., 2004). By sharing the participants' personal experiences, Levins et al. provided a better understanding of the physical activity barriers and enablers.

Theory of Planned Behavior

Latimer and Ginis (2005) also noted the numerous physical activity barriers people with an SCI experienced when engaging in physical activity. In this study, the authors applied the theory of planned behavior. The theory of planned behavior was developed by Ajzen and is one of the most widely used frameworks to examine physical activity determinants (Latimer & Ginis, 2005). The theory bases a person's intentions and behaviors on several determinants: those personal in nature, those reflecting social influence, and those dealing with control issues (Ajzen, 2005). Latimer and Ginis examined the theory of planned behavior to predict the leisure time and physical activity among people with an SCI through telephone interviews. These interviews with participants assessed three constructs. The first construct examined participants; attitudes,

including their positive or negative evaluation of the behavior. Subjective norms refered to the social influences and pressures to perform the behavior. Lastly, perceived behavioral control referred to the ease or difficulty in performing the behavior (Latimer & Ginis, 2005). The results from this study supported the use of the theory of planned behavior to better understand the leisure time and physcial activity among people with an SCI (Latimer & Ginis, 2005). The authors found that the participants' attitudes, subjective norms and perceived behavior controls were predictors of intention. The intentions, in turn, were predictors of behavior (Latimer & Ginis, 2005).

In this study I used the constructs of the theory of planned behavior to develop interview questions. This theory was chosen since it is often used for examining determinants of physical activty, which is also the purpose of this proposed study. The questions developed for the in-depth interviews were related to attitudes about physical activity, motivation and perceptions about physical activity, influences and perceptions from others about physical activity, and ability to perform physical activity. For example, aspects of attitudes may be reflected by the lack of knowledge of the benefits to physical activity (Latimer & Ginis, 2005). Perceptions of inaccessible facilities or positive experiences with exercise options are potential perceived behavior controls (Kehn & Kroll, 2009; Latimer & Ginis, 2005). Subjective norms may be reflected by a lack of encouragement from loved ones to participate in physical activity (Latimer & Ginis, 2005).

Quality of Life for People With Spinal Cord Injury

Quality of life is often used in assessments for people with an SCI. For people with an SCI, quality of life refers to the physical, social, psychological, and existential aspects of well-being that are affected by disease, disability, and treatment (Tate, Kalpakjian, & Forchheimer, 2002). Since quality of life is a main outcome in determining the success of rehabilitation programs for people with an SCI, Manns and Chad (1999) conducted a cross-sectional exploratory study to determine the relationships among fitness, physical activity, quality of life, and handicap. They found that improving fitness and increasing the level of physical activity may lead to improved health and function in people with SCI (Manns & Chad, 1999). Manns and Chad examined whether physical activity and fitness also improved quality of life. In their study, quality of life referred to a participant's satisfaction with health, relationships, emotional, social and physical function, happiness and satisfaction with living arrangements and finances (Manns & Chad, 1999). The term "handicap" referred to how well a person was able to perform daily tasks. Handicap is an indicator of the impact a physical disability has on day-to-day functions (Manns & Chad, 1999). These indicators of quality of life were measured using the Quality of Life Profile: Physical and Sensory Disabilities Version.

The results of this study were that physical activity may have a significant role in handicap for people with an SCI. Physical activity was positively correlated with physical independence, mobility, and occupation. These findings support the implementation of health promotion strategies that include fitness and physical activity interventions (Manns & Chad, 1999). The results from this study support previous research, which also

suggests that physical activity and fitness level are related to better physical independence and mobility (Manns & Chad, 1999). Although Manns and Chad found a positive relationship between handicap and physical activity, there was not a significant relationship found between subjective quality of life and physical activity. The authors proposed that this lack in relationship between activity and subjective quality of life may be related to the measure used (Manns & Chad, 1999).

Ginis et al. (2003) also studied how exercise may enhance subjective well-being and quality of life in people with an SCI. The authors focused on the impact of exercise as a strategy to reduce pain and improve subjective well-being in people with an SCI. While a large body of research has demonstrated the benefits of exercise in the general population, little research has been conducted on how exercise impacts the well-being and quality of life of people with an SCI (Ginis et al., 2003). The purpose of the study by Ginis et al. was to determine if the level of stress and pain in people with an SCI changed based on their level of exercise and if the amount of physical activity resulted in changes in their psychological well-being and quality of life. The authors conducted a randomized control trial with participants engaging in aerobic and resistance training twice a week. The control group maintained their usual activity level (Ginis et al., 2003). Results from the study indicated that, within three months, the participants who exercised twice weekly reported less stress, pain, depression, a better overall quality of life, and better physical self-concept (Ginis et al., 2003). In addition, participants who exercised reported significant improvements in their satisfaction with physical function and appearance. The control group showed little or no change in these indicators (Ginis et al., 2003). The

results from this study suggest that exercise may improve pain and stress levels in people with an SCI (Ginis et al., 2003). These changes in the level of pain and stress a person with an SCI experiences may be a mechanism by which exercise improves subjective well-being (Ginis et al., 2003).

Evaluating Exercise and Fitness Programs

For people with physical disabilities, the goals of a health promotion program are to reduce secondary conditions, maintain independence, provide an opportunity for enjoyment and leisure time activities, and enhance overall levels of independence (Rimmer, 2005). Increasing physical activity levels is one of the most effective ways to improve functioning and increase independence in people with disabilities (Santiago & Coyle, 2004). Since most people with an SCI are sedentary, promoting physical activity is an important objective for health initiatives in this population (Latimer et al., 2006). Multiple studies have examined the benefits of fitness and physical activity in people with an SCI (Ginis et al., 2003; Manns & Chad, 1999; Rimmer 2005).

A main public health message for increasing physical activity is walking and taking the stairs. However, for most people with an SCI, walking and taking the stairs is not possible (Rimmer, 2005). Alternative forms of physical activity should be stressed for this population. However, there is limited information regarding the best types or amounts of activities to prescribe to people with an SCI (Ginis et al., 2008). Warms et al. (2004) sought to determine if a physical activity program is accepted and feasible for people with an SCI. The authors evaluated a physical activity program by using a non-experimental pre-post-test design. At baseline and at 6-week post program, measures of

physical activity, exercise readiness, health activity barriers, and self-efficacy for health practices and exercise, health, depression, and muscle strength were taken. The researchers developed a program called "Be Active in Life" that was based on the transtheoretical model of health behavior change (Warms et al., 2004). The components of this program included written educational materials, home visits with a nurse, and follow-up phone calls. During the home visit participants chose the activities for their self-selected plan. The most commonly chosen activities included strength training using elastic tubing or hand weights, pushing the wheelchair outside or indoors, stretching, and increasing the amount of time spent conducting household chores (Warms et al., 2004). The results from the study found that 81% of participants progressed one or two stages on the stages change scale. Motivational barriers decreased significantly while exercise self-efficacy, self-rated health, and muscle strength significantly increased (Warms et al., 2004). The overall impressions from participants in the program were that it was easy to participate in and understand. The program required a reasonable amount of time, did not interfere with other activities, and provided a benefit (Warms et al., 2004).

Hicks et al. (2003) designed a randomized control study to examine the effects of 9 months of twice-weekly exercise on strength, arm performance, psychological well-being, and quality of life components in people with an SCI. Results from this study showed that the exercise group had significant increases in upper body muscle strength (19-34%), whereas no changes were identified in the control group. The participants in the exercise group reported less pain, stress, and depression as well as higher satisfaction in physical function, level of perceived health, and overall quality of life after the training

compared to the control group (Hicks et al., 2003). The results from this study illustrate both the feasibility and benefits of a long-term exercise program in this population (Hicks et al., 2003).

Strategies for Preventing Secondary Health Conditions

Creating innovative strategies for preventing secondary health conditions, improving health, and preparing people with disabilities to manage their own health is an important public health priority (Rimmer, 2006). In order for these strategies and health promotion programs to be effective, health professionals must understand the numerous factors that impact physical activity among people with physical disabilities. As Rimmer noted, health professionals have expressed difficulty in keeping people with disabilities involved in community-based physical activity programs. Part of the reason for this is that the intervention plans provided to the participants do not match their needs. There are a multitude of personal and environmental factors that influence the participants' level of activity. Rimmer suggested the use of the International Classification of Functioning, Disability, and Health as a tool to encourage participation in activity programs. This classification provides a standardized language for describing health and health related states for people with disabilities. Rimmer asserted that using the international classification may assist health professionals in identifying factors that increase or decrease participation in physical activity. These factors may be personal or environmental or related to functioning. By discouraging broad recommendations to engage in exercise and instead understanding the participants' specific impairments,

limitations, and restrictions, health professionals can tailor physical activity routines that will have a greater likelihood for success (Rimmer, 2006).

Summary

People who have a physical disability are less physically active compared to the general population (Durstine et al., 2000). Less physical activity often results in physical deterioration and a further reduction in physical activity. Consequences of an inactive lifestyle include the development of secondary health conditions, including obesity (Durstine et al., 2000; Liou et al., 2005). A major component for the health care of people with disabilities should be focused on the prevention of secondary conditions (Liou et al., 2005). One way to prevent these secondary health conditions is to increase physical activity. Doing so may reverse physical deconditioning, improve physical functioning, and enhance overall health and wellbeing (Durstine et al., 2000). Studies have examined the benefits of promotional programs that are inclusive or designed specifically for people with physical disabilities.

While the risks for secondary health conditions resulting from a lack of physical activity in people with physical disabilities has been noted in the literature, limited studies are available about why people with physical disabilities do not engage in physical activity (Kehn & Kroll, 2009; Rimmer, et al., 2004). Information gaps also remain regarding facilitators and barriers to physical activity among people with physical disabilities. Preventing secondary conditions requires understanding and intervening in both individual risk factors and environmental determinants of health and quality of life (Kinne et al., 2004). To better understand barriers and facilitators to physical activity,

which will assist in determining appropriate interventions, this phenomenological study gave a voice to adults with an SCI about their experiences and expectations related to physical activity by including in-depth interviews with adults with an SCI. The findings from this study add to the existing literature about facilitators and barriers to physical activity from the viewpoint of the participants.

Chapter 3: Research Method

Introduction

The purpose of this qualitative phenomenological study is to describe the experiences of physical activity, including facilitators and barriers to participation, among adults with an SCI. A comprehensive review of the literature, which detailed the secondary health conditions that impact people with physical disabilities, including SCI, and particularly those health conditions related to a lack of physical activity, was presented in Chapter 2. While other researchers have examined facilitators and barriers to physical activity among people with physical disabilities, in this study I gave a voice to adults with an SCI about their experiences and expectations related to physical activity. The findings of this study contribute to the topic of physical activity among adults with an SCI, by adding to the literature from the viewpoint of the participants. The study provided an accurate description of people with an SCI's experiences with physical activity so that the reader may better understand how this phenomenon is experienced.

In this study, I used a phenomenological research design to provide understanding of the lived experiences of physical activity among adults with an SCI. The qualitative methods and design used to examine the experiences people with an SCI have as it relates to physical activity is outlined. Included in this chapter is the presentation of the research questions, discussion of data collection methods, ethical considerations, and the procedure of the data collection.

Research Methodology

I used a qualitative research approach, specifically phenomenology. People's

perceptions or experiences may be better understood by using a qualitative research approach (Creswell, 2003). Before deciding on qualitative research, I explored whether a quantitative approach would be more appropriate. The quantitative tradition was rejected because of the nature of the research question in which I am seeking to understand rather than compare (Creswell, 1998). With qualitative studies, the researcher collects open-ended data in an effort to develop themes from the data (Creswell, 2003). Qualitative research was also chosen because of the need to present a more detailed view of the topic of physical activity among adults with an SCI (Creswell, 1998).

Research Design

Phenomenology is one qualitative tradition of inquiry and describes the "meaning of the lived experiences for several individuals about a concept or phenomenon" (Creswell 1998, p. 51). The term phenomenology was first used in philosophy in 1795 to refer to describing what one perceives or senses from one's experiences (Moustakas, 1994). The phenomenological approach was chosen because it allowed me to be able to work with a small group of participants who experienced a specific phenomenon. Husserl, the founder of phenomenology, concentrated on the human experience, including perceptions, imagination, emotions and actions, which is referred to as transcendental phenomenology (Moran, 2000). Husserl believed that a single experience had the potential to bring insight and universal truth (Moran, 2000). Researchers must be constantly vigilant to not allow certain assumptions about the world to interfere and influence the understanding of the experience (Moran, 2000).

Phenomenology explores the descriptions of experiences, rather than explanations or analysis (Moustakas, 1994). Phenomenology inquiry asks, "What is this experience like?" in an attempt to understand meanings from everyday existence (Laverty, 2003, p. 22).

Hermeneutic phenomenology was another methodology considered but was rejected for this study. Hermeneutic phenomenology focuses on the "mode of being human" instead of understanding beings or phenomena (Laverty, 2003, p. 24). Hermeneutic phenomenology examines the structure and interpretation of texts and focuses on language and communication (Phillips-Pula et al., 2011). Transcendental phenomenology was chosen over hermeneutic phenomenology because I was interested in understanding the essence of the experience of physical activity among people with an SCI (Moustakas, 1994).

Creswell (1998) discussed several approaches to phenomenology, including the psychological approach, which focuses on the individual experiences rather than group experiences. Similarly, in this research, I focused on the individual experiences of participants who have an SCI. From these individual experiences, general meanings were determined (Creswell, 1998). Other methods of qualitative inquiry were considered but rejected. For instance, an ethnographic study focuses on examining a group's learned and observable behaviors (Creswell, 1998) through the immersion of the researcher into the daily lives of the participants and conducts prolonged observations (Moustakas, 1994). This type of research was not practical for this study. Another method considered was a case study, which is the exploration of a case over time that is

detailed and includes in-depth data collection with multiple sources of information (Creswell, 1998). The case being studied would be an event, program, or activity. This type of approach did not fit because my interest was not in what was occurring over a particular time, but rather on what is currently being experienced by people with an SCI as it relates to physical activity (Creswell, 1998). Another method considered was grounded theory. The focus of grounded theory is on generating or discovering a theory through careful analysis of the data and field note examination (Moustakas, 1994). The researcher studies how people act and react to a phenomenon by conducting interviews and making multiple field visits (Creswell, 1998). Since I was focused on the meaning of the experiences of people with an SCI, a grounded theory approach did not fit. The last method considered but rejected was a biography. This is the study of an individual and that person's experiences as told by the researcher (Creswell, 1998). Again, because the focus of this research was on more than one person, this method did not apply.

Participants of the Study

In total interviews were conducted with 10 participants. The first two participants were the pilot participants. The participants were all adults, 18 years of age and older, who have had an SCI for at least 1 year, but no more than 10 years, and use a wheelchair. This study was open to participants with all levels of SCI, including both paraplegia and tetraplegia. Participants were not separated in terms of their level of SCI; however, information about their type of SCI was noted in the analysis. As Creswell (1998) explained, the participants "must be individuals who have experienced the phenomenon being explored and can articulate their conscious experiences" (p. 111).

Participants were recruited through the National Spinal Cord Injury Association (NSCIA)-Greater Atlanta Chapter and through an SCI support group listserv sent out by an individual from the Atlanta, GA area.

Measures

The purpose of this study was to understand the participants' experiences with physical activity, including the barriers and facilitators to participation. In this study, physical activity referred to performing exercise, defined as 150 minutes of moderate to intense activity a week (CDC, 2013a).

The research questions were as follows:

1. How do people with SCI perceive their experiences with physical activity?
2. What are the perceived barriers to physical activity among people with an SCI?
3. What are the perceived facilitators to physical activity among people with an SCI?
4. What role does the natural and social environment have in the level of physical activity among people with an SCI?

Ethical Protection of Participants

The participants in this study were adult volunteers, 18 years of age and older, who were free to choose whether or not to participate. There was no known harm associated with study participation. All participants completed a consent form and their confidentiality was protected. Notes, audio recordings of the interviews, and transcripts are stored at my home in a locked filing cabinet. My dissertation committee and I are the

only ones who have access to the transcripts. I removed identifying information from the transcripts.

Procedures

The following procedures were used to recruit participants and inform them of the study, collect and analyze data, and validate the findings.

1. Contacted, via telephone and email, The Shepherd Center SCI support group leaders and NSCISA-Greater Atlanta Chapter support group leader to request permission to share information about the study.
2. Both The Shepherd Center and NSCISA support group leaders responded that they were interested in sharing the study information.
3. Per Walden University's Institution Review Board (IRB) request, I contacted The Shepherd Center Research Board who did not approve my request to share recruitment information because it was not a funded study. I contacted NSCISA's legal counsel who approved my request to share the study recruitment information.
4. For that reason, recruitment occurred primarily through NSCISA. I sent an informative email to the NSCISA contact to provide details about the study.
5. Hard copies of the recruitment flyer were distributed by the NSCISA contact. Additionally, the contact shared the recruitment information electronically. The recruitment information requested that interested potential participants contact me to schedule an interview.

6. Recruitment information was also distributed through another SCI support group listserv. Once I was made aware that the recruitment information was disseminated through this listserv, I contacted IRB and requested a change of procedures. IRB approved this additional recruitment method.
7. Interested participants contacted me by email or telephone. I confirmed that each participant met the study criteria.
8. For participants who met the study criteria, I sent them an email 2 days before the scheduled interview to remind them about the interview and provide a copy of the consent form.
9. At the beginning of the interview, the participant received a consent form. The consent form was signed before the interview started.
10. During the open-ended interview, predetermined questions (see Appendix A) formed the basis for the interview and helped guide the discussion. The interviews were recorded and I took notes.
11. Each participant received a $15 gift certificate for participation.
12. Interviews were transcribed verbatim and analyzed. Researcher notes were typed.
13. NVivo software was used to assist in the data analysis.
14. Participants were provided the opportunity to review their transcript for accuracy. This assisted in helping present more clearly or fully the participants' experiences.

Data Collection

I began each interview by providing information about the study, reviewed the consent form and asked the participants to sign the consent form. Next I gathered

background information, including how the participants developed an SCI and how long they had an SCI. The purpose of this part of the interview was to develop rapport with the participants. Following this portion of the interview, open-ended interview questions were asked that focused on the participants' experiences with physical activity. Moustakas (1994) explained that the phenomenological interview is an informal and interactive process, which includes the use of open-ended comments and questions. Open-ended questions allow participants to speak informally about their experiences without fear of providing the wrong answer. While I had developed questions in advance to assist in facilitating discussion, I also let the participant's responses guide the interview, in particular the order in which I asked the questions. The interview questions first focused on one experience, and moments of particular awareness as the participants were asked to describe an experience when they engaged in physical activity (Moustakas, 1994). The interview was conversational in nature (Moustakas, 1994). Moustakas explained that it is the researcher's responsibility to create a climate that allows the participant to feel comfortable so they are able to respond comprehensively and honestly. For this reason, the in-person interviews were conducted in a location selected by the participant that ensured privacy and was a comfortable setting. Each interview, whether in-person or telephone, was audio-recorded and transcribed. I also took notes during the interview. Recording the interviews provided recorded evidence. Every effort was made to transcribe interviews within 1 week of the interview so that the details were accurately reflected.

Data Analysis

As Creswell (1998) explained, a computer program can be used to assist with data analysis. I used NVivo 10 software to assist in the data analysis by searching for certain words, determining word frequency, uncovering connections, and ultimately grouping into themes. The interviews were transcribed and the transcripts loaded into NVivo. Moustakas (1994) explained the phenomenological data analysis steps first begin with horizonalization. Horizonalizing the data means that each statement has value (Moustakas, 1994). I started by reading each file in its entirety, paying close attention to the words used by the participants. The purpose of this step was to gain an understanding of the type of information the data provides. I located within the transcripts key phrases or experiences that related to the phenomenon being studied. I coded the data so that I was able to develop and determine themes. Coding refers to taking the materials, in this case the materials are the transcribed data, and organizing the materials before determining the meaning (Creswell, 2003). I organized the text by interview question. I went through this process with each transcript. The codes helped determine the themes. Themes are those topics that are common among the group of participants. Creswell (2003) explained that the themes should "display multiple perspectives from individuals and be supported by diverse quotations and specific evidence" (p. 194). These themes related to social interactions, types of activities, outcomes, and descriptive elements as they described their experiences with physical activity. NVivo added transparency to the research as the coding of the data was documented through the software program.

Verification of Findings

Even with qualitative research, which focuses on understanding data instead of measuring data, it is important to know if the study results are accurate. To assess the quality of the research, Lincoln and Guba (1985) discussed alternative terms that can be used with qualitative data compared to the terms used in quantitative data. For instance, Lincoln and Guba described the "trustworthiness" of qualitative research by using terms such as credibility, transferability, dependability, and confirmability.

Trustworthiness refers to the researcher being able to persuade the audience that the findings are worthy of being taken seriously (Lincoln & Guba, 1985, p. 290). Lincoln and Guba used the term credibility in place of internal validity to refer to whether the findings will be found to be credible or believable. They suggested several major techniques that can make it more likely that credible findings will be produced. One of these techniques is that the researcher will work to build trust by investing a significant amount of time learning about the culture of the group being studied (Lincoln & Guba, 1985, p. 301). This technique will increase the accuracy of identifying and describing the participants and their experiences. Another way to increase credibility is to have participants review the interpretation of the analysis for accuracy. In this study, participants were given the opportunity to review the transcription of their interview to ensure that I understood what was said correctly.

Transferability is the term Lincoln and Guba (1985) used instead of external validity; this refers to the degree that the research can be generalized or transferred to other settings. Transferability can be enhanced by thoroughly describing the context of

the research (Trochim, 2006). I included direct quotes that provide rich, abundant, thick descriptions (Creswell, 1998). The use of thick descriptions to provide details helps the reader make decisions in regards to transferability (Lincoln and Guba, 1985).

Dependability

Dependability is the term used in place of reliability and ensures that the research findings are consistent and could be repeated (Lincoln & Guba, 1985). To ensure dependability, I thoroughly documented and detailed each stage of the process so that another researcher who may review this information could repeat the study. Keeping detailed records also allowed the reader to assess the extent that I used proper research practices (Shenton, 2004).

Confirmability

Confirmability refers to the degree to which others can confirm the results or corroborate with others (Lincoln & Guba, 1985). One strategy for enhancing confirmability is to have the researcher document the procedures for checking and rechecking the data (Trochim, 2006). Another method to enhance confirmability is to have a researcher who is not involved in the study review and question the results (Trochim, 2006). A behavioral scientist colleague who is not involved in the researcher reviewed the results of the study.

Creswell (1998) discussed eight verification procedures that should be used to establish the credibility of the qualitative research. These verification procedures included prolonged engagement or persistent observation, triangulation, peer review or debriefing, negative case analysis, clarifying researcher bias, member checks, rick thick

description, and external audits (Creswell, 1998, p. 201-203). This proposed research included the following procedures: clarifying researcher bias, member checks, and rich, thick description.

Clarifying researcher bias is important so that the potential biases or assumptions that may influence the inquiry are clarified (Creswell, 1998, p. 202). As is the case in other forms of research, it is important when conducting phenomenological research to look, notice, and be aware without prejudgment (Moustakas, 1994, p. 106). I have been studying people with disabilities since 2004 when beginning my master's degree, which was related to the media's portrayal of people with disabilities and media coverage of landmark disability moments in history. Thus, I come to this research with prior knowledge about facilitators and barriers to physical activity among people with an SCI.

My previous experiences researching disability were mentioned to each participant at the start of the interview. The identification of my preconceived ideas is called epoche (Creswell, 1998). Acknowledging and having awareness of these potential personal assumptions in advance helped minimize the biases and allowed me to approach the research with an open mind.

Additionally, another way to ensure that biases were not evident was to follow the same structured interview guide with each participant. While the goal was to have the interviews be more conversational, using the same standard questions assisted in maintaining consistency. Member checks involved providing the data to the participants for review of accuracy (Creswell, 1998, p. 203). Participants of this study were provided the transcripts from their interview and asked to verify the information. This process of

having the participants review the information assisted in validating that I understood what participants said. I also followed up with participants about any information that is unclear. Rich, thick description refers to the researcher providing details of the participants. These detailed descriptions allow the readers to decide if the information can be applied to other settings if there are shared characteristics (Creswell, 1998). I included verbatim quotes from the interviews to allow the reader to better understand the perspective of the participants.

Discrepant Data

Presenting the discrepant data is another strategy used to check the accuracy of the findings. Discrepant data, which are data that "runs counter to the themes" are an important part of validating the findings (Creswell, 2003, p. 196). While discrepant data are counter to the theme, Creswell explained, "because real life is composed of different perspectives that do not always coalesce, discussing contrary information adds to the credibility of an account for a reader" (p. 196). In my analysis I also included discrepant data.

Summary

In this chapter, the phenomenological research design was described. The qualitative methods and design used to examine the experiences people with an SCI have as it relates to physical activity was outlined. The rationale for using a qualitative design, specifically the transcendental phenomenological approach, was discussed. The participant selection, ethical considerations, data collection process, data analysis steps,

and verification of the findings were addressed. In Chapter 4 I include the findings from this study in a detailed narrative.

Chapter 4: Results

Introduction

The purpose of this qualitative phenomenological study was to describe the experiences of physical activity, including facilitators and barriers to participation, among adults with an SCI. Ten participants with an SCI were interviewed and detailed their experiences surrounding SCI and physical activity. In this chapter, I have included an explanation of the interview process; an overview of the participants; how the data were collected, analyzed, and stored; and the themes that emerged through the data analysis. The interviews were reviewed and presented as they relate to the main research questions.

Research Questions

Research Question 1: What are the experiences with physical activity among people with an SCI?

Research Question 2: What are the perceived barriers to physical activity among people with an SCI?

Research Question 3: What are the perceived facilitators to physical activity among people with an SCI?

Research Question 4: What role does the natural and social environment have in the level of physical activity among people with an SCI?

Participant Recruitment and Prescreening

The recruitment process for this study was challenging at times. The participants in this study were recruited in several ways beginning November 2014 to June 2015. The IRB approval number is 11-11-14-0077319. A representative from the NSCIA-Greater

Atlanta Chapter shared the recruitment information electronically multiple times through a listserv. This listserv included people living both in the general Atlanta, GA area and in other places throughout the country. The representative also distributed the flyers in person at NSCIA events. Additionally, throughout this process, chain referral occurred. For example, after conducting my first pilot interview, the pilot participant sent a response to the listserv letting people know that he had participated, that he felt my intentions were pure, and that it was an enjoyable interview. I was only made aware that he did this after the fact but was appreciative of the feedback. Likewise, several participants who completed the interview mentioned that they planned to tell their friends or workout companions about the study. The two pilot participants as well as the first six participants were recruited by these measures. Despite expanding the participant criteria during the recruitment process to allow for telephone interviews, I did not get enough responses to complete the required number of interviews. After seeking advice on additional potential recruitment methods, my recruitment information was sent out to another SCI support listserv on May 6, 2015. Once I was made aware that the recruitment information was distributed through this listserv, I contacted IRB and requested a change of procedures. Once IRB approved this additional recruitment method, the two remaining interviews were completed in June 2015.

Participants responded to the recruitment flyer by emailing or calling me. I then contacted the participants either by telephone, text, or email to confirm they met the study criteria and decided on the interview date, time, and location. The study criteria required participants to have an SCI that requires the use of a wheelchair, be 18 years of age or

older, have had the SCI for more than 1 year and no more than 10 years, and speak and understand English.

Data Collection and Recording

For participants who were interviewed in person, the participants were asked to choose a location for the interview process that was accessible as well as somewhere they felt comfortable being interviewed. Interviews were conducted in restaurants and coffee shops. For interviews conducted via telephone, I contacted participants from my private office to ensure confidentiality and privacy.

Individual Interviews

In total 10 participants completed interviews. The first two participants who responded to the recruitment flyers served as the pilot participants for the study. The remaining eight participants participated in the main study. Consent forms were sent to participants in advance, and a hard copy was provided to each participant for the in-person interview. For interviews conducted over the telephone, informed consent letters were emailed to the participants in advance. Participants agreed to the terms of the consent form by replying "I consent." Interviews varied in length depending on the participant, although most were approximately 45 minutes to 1 hour. The shortest interview lasted 32 minutes and the longest interview lasted 1 hour and 49 minutes, although that participant was asked several times if he wanted to continue even after the interview went over the time allotted. Pilot interviews were conducted in December 2014. Both pilot interviews were conducted in-person. The eight main interviews were conducted from February 2015 through June 2015. For the main study, five interviews

were conducted over the telephone and three interviews were conducted in person. Each interview was recorded on audiotape. Each audiotape, transcription, and signed consent form is stored in a locked filing cabinet and will be destroyed after 5 years.

Participants were reminded of the confidential nature of the study and were told that they could decide to withdraw from the study at any time or decline to answer any question that made them uncomfortable. Participants were also reminded that the interviews would be audiotaped and later transcribed.

After consent forms were signed, I provided all participants with a short background about my interest in the topic, which began as an undergraduate student. I first asked each participant a few standard background questions, including "What type of SCI do you have; how long have you had an SCI; and how did your SCI occur?" After these questions, I asked participants to describe their experiences with physical activity before and after developing an SCI. Many of the participants' answers to questions overlapped with additional questions, so at times I did not follow the same order for asking the interview questions. However, I made sure that all of the semistructured interview questions (Appendix A) were asked to each participant. Additionally, some answers to questions warranted me asking follow up or additional questions. Participants received a $15 gift card for participation. Participants were told that they would receive a transcribed interview to review and could contact me at any time if they had additional information to share.

Pilot Study

A pilot study was conducted with the first two participants to determine the time length of the interview and if the questions were appropriate. The pilot study was conducted using the same interview protocol as the main study. A letter of informed consent was sent to the participants who agreed to participate in the pilot study. To elicit feedback regarding the interview process, the pilot participants were asked if there were other questions I should ask as it related to the topic. The pilot interviews also served to gauge the amount of time it took for the interview. None of the questions were changed, and the interview process and length were found to be appropriate.

Profile of Participants

The following descriptions are provided as an introduction to each of the eight main participants regarding their physical activity level. The participants are presented in the order in which they were interviewed.

Participant 1: Male who sustained a T1-T2 SCI in 2006 as a result of a motorcycle accident. Now 9 years after the accident, he works out at home daily for 2.5 to 3.5 hours a day. He also works out at a specialized gym for people with disabilities 2 days a week for 2 hours each time.

Prior to his injury Participant 1 exercised because of his love of surfing. He explained,

> The big reason I exercised is because I surfed. I loved to go to the gulf coast and surf. I would work out 3 to 4 times a week for over an hour doing various

> exercises and a total gym. I worked on a three-story building and I would never use an elevator.

Participant 2: Female who sustained an incomplete SCI in 2010 from a car accident. Participant 2 used to go to physical therapy appointments 2 or 3 times a week, but insurance denied her therapy, so she does not participate in any physical therapy at this time. Her current physical activity includes moving her legs and exercising in 5-minute increments. Prior to her injury, the participant stayed active walking to and from her classes on a college campus.

Participant 3: Female who sustained a T-9 incomplete SCI 2 years ago as a result of surgery. Her current exercise is not consistent but includes using free weights, wheeling around for normal activities, such as walking her dog, and physical therapy sessions 2 or 3 times a week in her home. Participant 3 described her activity level prior to her injury as very active. She had a physically demanding job as well as enjoyed working out. She said,

> I worked out pretty often. There were years prior that I worked out feverishly and I lost a lot of weight…The elliptical was my favorite and free weights. I even had DVDs with Zumba, Denise Austin, Billy Blanks-I loved exercise.

Participant 4: Female who sustained a T3-T7 incomplete SCI from a car accident 3 years ago. She has rehabilitation therapy 2 days a week, is a dance teacher, exercises at home 2 to 3 days a week, and participates in yoga 3 to 4 days a week. Prior to her injury, Participant 4 stayed physically active as part of her job and for pleasure. She taught dance classes and movement therapy 5 days week and went to yoga classes. She said,

> I believe in mixing up activities, so the gym, tai chi, yoga, and walking my dog. And of course daily activities, like cleaning the house. I am obsessive compulsive about that.

Participant 5: Male who sustained a T4-T6 SCI 7.5 years ago in a motorcycle accident. His current exercise includes upper body strength exercises related to moving from place to place in his wheelchair as well as working a full-time job and wheeling on carpet. Prior to his injury, Participant 5 was a track coach and also a personal trainer. He said,

> Before the accident I was a track coach who ran with my kids. I did 7 years of karate, 3 years of tae kwon do, and weight trained for 10 years.

Participant 6: Male who sustained a T4-T5 SCI 8 years ago in a motorcycle accident. His current physical activity consists of breeding dogs and taking care of the dogs as well as living in a two story house and getting from one level to the other. Prior to his injury he was a truck driver, which he admitted did not leave much time for exercise; still, he considered himself to be in good physical shape.

Participant 7: Male who sustained a T5 SCI when he was hit by a car while cycling 9 years and 11 months ago. His current physical activity includes using a hand cycle 1 to 3 times a week. He participates in wheelchair races regularly. Prior to his injury, Participant 7 was an ironman athlete who exercised regularly and considered his level of physical activity to be higher than most people.

Participant 8: Male who sustained a T10 SCI 5 years ago when he was hit by a car while cycling. He is currently training for races so is exercising 5 to 6 days a week,

which includes hand cycling, swimming, riding in his racing chair, and using hand weights. Prior to his injury Participant 8 competed in races and his physical activity included exercising 5 to 6 days a week as a triathlete. Table 1 shows the descriptive demographics for the study participants.

Table 1

Descriptive Demographics for the Study Participants

Participant code	Gender	Years with SCI	Type of interview	State of residence
Pilot 1	Male	6 Yrs.	In-Person	Georgia
Pilot 2	Male	2 Yrs.	In-Person	Georgia
Participant 1	Male	9 Yrs.	Phone	Texas
Participant 2	Female	5 Yrs.	Phone	Texas
Participant 3	Female	2 Yrs.	Phone	Texas
Participant 4	Female	3 Yrs.	Phone	South Carolina
Participant 5	Male	7 Yrs.	In-Person	Georgia
Participant 6	Male	8 Yrs.	In-Person	Georgia
Participant 7	Male	9 Yrs.	Phone	Georgia
Participant 8	Male	5 Yrs.	In-Person	Georgia

Data Tracking

To track the data and identify emerging themes, I transcribed each interview into an individual Word document. I used my personal laptop to transcribe the interviews. Audio-recorded interviews were reviewed multiple times in order to complete the transcription and check for accuracy.

Data Analysis

The Process

Transcribed interviews were read several times in their entirety before I started highlighting key phrases or terms (codes) that reoccurred between participants. I listed

each interview question on a separate piece of paper and then wrote down the key parts of each participant's answer to the question. If more than one participant gave the same or similar response to the same question, I tallied that on the paper. From this exercise, codes emerged from the recurrent phrases, statements, and words. Because of the similarity of some of the questions, after I completed this exercise for each question, I grouped like codes together. For instance, with the question "describe the last time you exercised," a participant's answer mentioned frustration, which was also given as a response by another participant to "how would you describe exercise to someone else who does not have an SCI." As another method of data analysis, the transcribed interviews were entered into NVivo 10, a software program that assists in qualitative analysis. I used both auto coding as well as inputting codes. Once again, I reviewed each line of each transcript to identify codes. Using NVivo, I also searched for word frequency. After determining the codes using both NVivo and by my own data analysis, I grouped the codes into clusters, which became the themes for each of the four research questions.

Findings

In the following section, I present data based on the participants' responses to the interview questions. Verbatim statements made by the participants are provided to illustrate major themes for each of the research questions.

Experiences With Physical Activity

The first research question was, "What are the experiences with physical activity among people with SCI?" To elicit responses, all participants were asked several

questions related to their personal experiences with physical activity. These questions included describing the last time they engaged in exercise and the feelings and thoughts generated by the experience, their experiences with physical activity since their injury, what physical activity meant to them, how their level of physical activity affected them, and the feelings and thoughts that stood out most when thinking about their current experiences with physical activity. Each participant willingly shared information regarding his or her experiences with physical activity. Several themes emerged from these questions about exercise experience including exercise as a lifestyle, frustration, importance of being physically active, and self-motivation. Table 2 shows the themes and associated codes related to experiences with physical activity.

Table 2

Themes Related to Experiences With Physical Activity

Theme	Codes associated	# of responses
Exercise as a lifestyle	Have always been physically active	6
	Exercise is a way of life	2
Frustration	Frustration with physical limitations	4
	Insurance frustrations	2
	Frustration trying to explain exercise to people without an SCI	3
Importance of physical activity	Critical to exercise for maintaining health	2
	Important to stay active to avoid developing secondary health conditions	3
Self-motivation	Internal motivation	4
	Prove to myself I could do it	3
	Determination to conquer a new skill	2

Themes

Exercise as a Lifestyle

Six of the eight participants specifically mentioned the important role physical activity has in their daily lives. For some participants, exercising is a continuation of the activity they did before the injury and helped them become physically active again after

their injury. For others, exercising is part of their therapy, healing process, and helps them be more independent and stronger. Two participants specifically said exercise is a part of their lifestyle.

Participant 8 explained that he was an elementary physical education teacher and personal trainer before he was injured. He said:

> I like to have a high level of activity, because again that's what I did before. And it is physical and mental, so if there are stretches where I can't work out for a week or something, it starts to wear on me. This is a lifestyle-it's what my wife and I do for mental and physical health. It's very important.

Participant 4 said that since she was a young child she has exercised, and that lifestyle has continued even since her injury:

> I can't remember a time when I wasn't physically active. It's who I am. I have a reputation to maintain…When I was in school we had to do fitness programs and it was part of our lifestyles. I have always been active and a performer. You can't be one without the other as a dancer. And I think as a performer and a teacher it's important that I put my best foot forward, forgive the pun, so people can see there are possibilities [participant pronounced "ibilities" like "abilities"], not disabilities.

Participant 5 explained that his desire to be completely independent encourages him to stay active daily:

> Working out to me is a way of life. And if you don't have strength you are not going to be able to do it.

Several participants specifically mentioned that their previous experiences with exercise helped them adjust to exercising with an SCI. Participant 8 reflected on his experiences with exercise compared to other people he has met with an SCI:

> You have to get past the mental part [of being injured]. I have met people who think their life is over. And I could have thought the same thing because my job was very active, my hobbies were active…It is an advantage for those of us who were physically active before, especially for me doing triathlons before, I knew how to do them, so now I just have to figure out the logistics. That alone is challenging and can be overwhelming, so being active before [being injured] is a huge advantage.

Participant 7 was an ironman athlete and also mentioned that while there was the advantage because he was previously active, there were still many challenges to exercising with an injury. He said:

> Whether you did it [exercised] in your previous life, or never did anything like that before, you are starting something completely new. It's a significant change and learning curve to figure out some of the most basic things. Like how to get in a chair, how to get on equipment, or if I fall, how do I get up? Even when you get older everything is still a struggle, but you get used to the struggle. I think that, uh, plays a lot into people's willingness to become physically active. Especially for people who were not physically active in their previous life. They didn't solve that problem before and now it's ten times harder.

Frustration

The challenges to physical activity weighed heavily on the participants, especially for those participants who were extremely active before their injury. Participants were asked to describe what they were thinking during the last time they engaged in physical activity. I spoke with Participant 4 only an hour after she had finished a dance rehearsal. She described the feelings she experienced while exercising:

> There was excitement of course to be able to do what I do. Frustration to not be able to do what I did. Joy, sorrow, and exhaustion because it takes so much effort to do what I do.

For Participant 3 who had recently changed therapists due to insurance, which resulted in a lapse in physical therapy, there were added frustrations:

> I feel worthless. Like I want to do more. I want to actually walk my dog. I don't want him afraid of my wheelchair. I want to run with him and play. I want to get down on the floor with him and I want to be able to take him down to the beach and the bay front. The little bit I can do and the pain it generates…Every once in awhile there is the feeling of 'yea, you rocked that' but right now with the injury being so new, there is frustration that I can't even begin to describe.

When asked to describe for someone who does not have an SCI what it is like to participate in physical activity, several participants said that unless you experienced an injury, you would not be able to understand the frustration and difficulties in what most people consider simple movements. Participant 5 said:

> They wouldn't understand because they don't have to do what we have to do on a daily basis. Because when you are walking you put focus on stamina and strength on your legs but very little focus on having to use your arms to propel yourself.

Participant 1 also mentioned that trying to explain what it is like to exercise to someone without an SCI was impossible. He said:

> People don't understand what it is like to exercise and consciously tell your foot to move or consciously tell your leg to lift, but when you are in the first stages of moving around in a walker you have to literally think of each motion manually.

Frustration was a common word used when participants were asked to describe the experience with exercise. In particular the frustration was a result of the longer amount of time it took to complete an activity or the amount of energy required for even the simplest of tasks. Participant 3 explained:

> I have almost given up on trying to explain. It seems to me that people don't get it. It's painful. It's frustrating. To try and pick something up and drop it ten times, it's excruciatingly frustrating. One of my favorite sayings to myself is if you wanna learn patience, get paralyzed. But you have no choice but to keep trying. You have to keep trying, keep trying, and keep trying.

Importance of Physical Activity

Despite frustrations that resulted from exercise, each participant recognized that being physically active was especially important for their wellbeing and overall health. Participant 1 stressed:

> It is critical for someone with an injury of this type, you are not moving around like a normal person moves around. You are not walking up and down stairs and moving down a sidewalk like a normal person does, so it is absolutely critical for your personal well being to do as much as you physically can and understand that doing what you can do now can lead to doing more later.

The recognition of the importance of exercising made not being able to exercise even more frustrating for some of the participants, in particular Participant 3 who said:

> It's very important. I can't even say…It's always been important to me to sweat and move and to feel like I am doing something. And this is driving me insane sitting here. I literally want to scream. I want to scream that my butt hurts. I sit all the time. Or when I am in bed I am laying on my back. I can't even say how important it is.

Self-Motivation

Despite the length of time the participant had the SCI, one overwhelming theme that I recognized was participants' motivation and desire to be physically active. Participants described in detail experiences from learning to stand in a walker, to getting into bed independently, to figuring out ways to transfer in and out of a racing chair.

Participant 1 gave an example of when he was playing a Wii cycling game where he had to find a certain number of flags. At his normal stopping point in the game he realized he missed a flag.

> I couldn't stop. I had to find that stupid flag. It took me 16 more minutes to find that damn flag. I pedaled for 46 minutes straight. It's really bizarre.

Another example of self-motivation is when Participant 3 described the length she went to in order to get into bed by herself. She said that when the physical therapist asked her how she did it, she could not adequately explain her desire to accomplish the task:

> He [physical therapist] was slap jawed and said it was amazing. He asked me how I did it and I couldn't explain to him how badly I wanted to do something like that on my own. You can't put that into words, but I will do this, I will. I am gonna do this. You can tell me I am not, but I am.

Participant 1 reflected on his exercise experiences over the past nine years and the struggles and triumphs he has experienced:

> Even if I fail, at least I can say I tried. There is something in my makeup that would absolutely kill me if I can't say I tried to do something…I keep envisioning the day that instead of getting into our wheelchair van I will get into our Mustang and go to a restaurant and get out with forearm crutches. That is one thing I keep bringing up, I just want to be able to get into a restaurant.

Participant 5 recounted his experience in the hospital with a friend after his injury when he decided to fight to recover:

> I just have motivation. When I was in the hospital a friend came and spoke to me and made me know there was more to life than laying in a bed and waiting for someone to help me. I thank him every day because I didn't have what it took at that moment to continue to fight. He reminded me of a lot of things I still had going on.

Participant 8 remarked that while a supportive family has helped greatly in his recovery, he is also self-motivated:

> My motivation is internal. I want to do something to prove to myself that I can. To some level I care what people think, but I am not going to do something for someone else or because someone told me I couldn't.

For Participant 4 much of her self-motivation was a result of not wanting to rely on others. She said:

> I don't like other people having to do for me so in order for me to be able to not need help, I have to take care of myself and do for myself. I don't want to be a burden to anyone ever. That's one of my hugest motivators. I don't want people doing for me.

As participants described their experiences with physical activity they also mentioned barriers. These barriers were discussed in more detail when participants were asked what made participating in physical activity challenging.

Barriers to Physical Activity

Research Question 2 for this study was related to perceived barriers to physical activity. Participants were asked what barriers they experienced that prevented or limited their exercise. The themes of cost, the added time and energy expenditure for exercise, the need for assistance during exercise, and embarrassment or unwanted attention were repeated throughout participants' answers. Table 3 shows the themes and associated codes related to barriers for physical activity among participants.

Table 3

Themes Related to Barriers to Physical Activity

Theme	Codes associated	# of responses
Cost	Cost for equipment	2
	Cost to use a specialized gym	3
Added time and energy expenditure	Takes longer to exercise	4
	Uses more energy	4
Assistance during exercise	Need assistance using equipment	3
	Need assistance transferring from chair to equipment	2
Embarrassment and unwanted attention	Unwanted attention	2
	Feels uncomfortable	2
	Seen differently	1
	Embarrassing	1

Themes

Cost

Five participants specifically mentioned the cost of exercise as a barrier to physical activity. One of the biggest challenges for participants who wanted to participate in exercise outside of going to a gym was the cost and availability for specialized equipment, such as racing chairs and hand cycles. Participants shared examples of equipment expenses. Participant 8 stated:

The big thing is cost for equipment. Hand cycle, racing chair-those are huge expenses, and that's the biggest barrier for most people. And for people who are interested, there is not much equipment out there to rent. You can't go borrow someone's mountain bike so it's a lot harder for us.

Participant 7 mentioned while there may be financial assistance for some to purchase adaptive exercise equipment; this option is not available to everyone:

> It's a catch 22. There are a lot of programs and funding sources available to pursue those things, provided you don't make too much money. That's my experience. I make a decent living which is why I am the in between. I got out of the hospital and had to get back to work because I had a family to feed and responsibilities…I feel fortunate to have a decent living that precludes me from getting a lot of additional help, but then I took out a loan to get the current bike I have right now. I paid it off and it's fine, but without the means I couldn't have.

Participant 7 also explained how the expense of the exercise equipment also impacts the availability of specialized equipment, which may influence a person's decision to participate:

> A lot of time that [pursuit of an exercise] depends on the equipment availability because a lot of times there is not loaner or rental equipment to try when you are talking thousands and thousands of dollars for the equipment.

Participant 8 participates in triathlons regularly, yet also mentioned that the required specialized equipment is a limitation.

It can be very overwhelming with the equipment. If I go to a triathlon, I have my racing chair, my hand cycle, my every day chair, my wet suit, goggles, all of that stuff.

For gyms that are tailored for people with physical disabilities, the price is a barrier. Participant 5 is currently saving money and applying for grants so he can work out at Project Walk, an SCI rehabilitation facility:

> I would like to go to Project Walk but they are not covered by insurance. They were $100 an hour, and now they are $75 an hour, which I still can't afford. I am not trying to be in this chair for the rest of my life. I want to get out of the chair… Their [Project Walk] whole philosophy is to get you out of the chair. They continuously work on getting you out of the chair.

Other participants also quoted prices of specialized gyms to be around $100 per hour. Participant 1 said:

> REACT is $100 an hour. I was there for a year and they saw my progress. So now I get a free hour every week. Most places are $100 an hour.

As one participant noted, while regular gym memberships are relatively inexpensive, other expenses related to the SCI make even mainstream gym memberships too expensive. Participant 5 explained:

> There are so many expenses. My chair is $5,000. And if someone is like me, they have to buy catheters constantly, and leg bands and other sanitary things on a regular basis. And then you need to be able to drive a vehicle. My hand controls cost another $1,000. And then there is therapy and insurance doesn't always pay

> for it. So financially you don't always have the ability to do what you want to do and that's the biggest barrier.

Participant 6 explained that because of her physical limitations, she would need to have a helper at the gym with her:

> I would not have access to the exercise equipment, so I would have to pay someone to join with me…I don't know of a single handicap accessible gym. I mean you can roll into one but to do any activity and get on and off equipment, I would need help…But really even parking at a gym is hard because there are not enough accessible parking spaces.

As Participant 1 also mentioned, while some exercises can be performed at home or in a mainstream gym, there is a need for professional assistance:

> When you have a professional looking at how your feet and legs are moving and have ideas about what works and what doesn't work it takes you to the next level.

Added Exercise Time and Energy Expenditure

Another barrier to physical activity for participants is the additional time required for exercising. Four of the participants mentioned the added amount of time it takes to exercise. Participant 7 said:

> One of the biggest inhibitors to consistent physical activity is because things take much longer when you have to do them by yourself.

Participant 7 provided an example of what is needed for him to exercise:

> It's a big pain in the ass is what it is. From the standpoint of uh, that everything takes twice as long. So it takes me longer to get to the gym and if I want to work

> out in the morning before work I don't have the ease of having clothes on a hanger and carrying it in a bag with shower stuff. I would have to pack it differently so it would all fit on my lap. So from the outside, the planning aspect makes it more difficult. And then when I get there [the gym] there is the manipulation of the equipment. Getting on and off the equipment, so I can't do the circuit work. I have to get on a machine and I do a set number of reps and on and off. And that time it takes to get on and off makes what I want to do for an hour, it may take me an hour and a half….It doesn't let me experience the same level of exertion because there are always starts and stops.

Participant 7 also compared a simple exercise routine for someone without an SCI to someone who uses a wheelchair:

> Obviously I don't run, so there is no, put my shoes on and walk out the door and run three or four miles in the neighborhood. I have to take my bike or racing chair and go some place… I live in a hilly neighborhood, which would be great to run in, but it would be unsafe for my racing chair because I couldn't stop. So I would have to load the chair in my truck, get to a track, get out, put the gear together and then that 30 minute workout has taken one and a half to two hours because of the travel and prep time.

In addition to the increased amount of time it takes to perform physical activity, four participants noted the extra energy required for even the simplest of exercises. Participant 2 said:

I think we need to use more energy or something. I think it's easier for someone who doesn't have an injury to exercise. It's totally different.

Participant 4 also mentioned the energy expenditure needed to not only perform an exercise, but also to get ready to exercise. She explained:

Another barrier is energy expenditure. For me by the time I get up in the morning and have my normal routine of teeth brushing, bowel and bladder program, that's half an hour, and then get into gym clothes and rolling and on and off equipment, it's exhausting…and it's time consuming.

Assistance During Exercise

Along with exerting more energy, five participants noted that many exercises required the help of someone else, which at times was a barrier. Participant 1 explained:

> The first barrier [to exercise] is your own disability. Many of the people cannot do anything, including myself, initially on their own at all. Literally you need someone to pick up your foot and move it. That means manpower, two or three therapists on one client. That takes time and money.

Participant 7 discussed how needing help during exercise made physical activity less enjoyable:

> I have a hand cycle set up in the basement on a trainer…By the nature of the way it's set up with a trainer, it makes it more difficult to get on and off. So a lot of time I struggle with it or have someone in the family help me get my feet up which then again, makes it less enjoyable because I have to pseudo rely on someone else.

Similarly Participant 8 explained how even though he is able to use the racing chair by himself, he prefers cycling with other cyclists so he is more visible to cars:

> I can't just go out and jump on my bike and ride. I rather have someone else with me to be more visible. Not being able to do stuff by myself is a huge barrier.

Embarrassment and Unwanted Attention

Another limitation noted by six of participants was the unwanted stares and comments from others when they worked out. Participant 5 said:

> We used to live in the city in an apartment and there was a gym and I would go to the gym and do a little bit here and there after the accident. But I wasn't comfortable based on the fact that there were people coming in who weren't in my condition and they would spend all of their time looking at me to try and see what I was doing or they would spend all their time trying to get out of my way.

Participant 2 also mentioned the stares from others as a reason she does not go to the gym:

> People see someone in a wheelchair at a gym and they see them differently.

Participant 4 is a dance instructor and while she continues to participate in exercise classes, she recognizes that it makes some abled-bodied people uncomfortable.

> I do regular yoga classes. I do stuff in my chair, get on the floor and roll around. And I try to mimic the poses. That's why yoga has been a big part of my exercise. But I don't go to yoga classes much because people don't want me there. They are uncomfortable with me there…You can tell people aren't comfortable with a crip coming in and being able to stretch a little more than they can or my chair rolling

> around a space where they are going to put their face. It's silly little things, but I can tell. But that doesn't usually deter me.

Participant 8 goes to a mainstream gym frequently, but also commented on the stares he gets from other people; however he also said that sometimes it results in positive outcomes:

> When I go to LA Fitness I am the only wheelchair there. And you may feel like people are looking at you or wondering what you are doing, but for me, I am working out for me. And a lot of people tell me when they see me that I motivate them. They say if a guy in a chair is doing stuff and it's easy for him, why am I complaining? And that's kinda cool. It's not why I am doing it though.

Additionally, Participant 8 provided an example of unwanted attention he received while hand cycling at a state park. A car slowed down and someone jumped out of the car and told him to "smile" as he took his picture and then got back in the car:

> I tell people I kinda feel like I am an animal at a zoo because I get lots of stares and pictures taken of me…So that's kinda weird, but then I have also had people come up and talk to me and that's kinda cool. I like that when they come up and ask us about our hand cycles or ask us stuff.

Participant 1 attends a specialized gym for people with SCI yet mentioned the added embarrassment he and others may experience while exercising is still a barrier. He explained:

> Another thing for a lot of people in wheelchairs is their bladder functions…I have a colostomy bag. I hate it. It's dehumanizing, but on the flip side, it keeps me

> from having any kind of accident that other people have. Lucky for me my bladder control is okay but for a lot of people they are still walking around with a bag on their leg and a tube and God, that's embarrassing…That takes an enormous about of chutzpah to go into a gym with other people and you have a urine bag attached to you. You are doing exercise and it's gonna show. Where I go the beauty of that is everyone has problems so they don't care, but if you tried to use a regular gym, oh my God. It would just be, I just can't imagine how that would be.

After asking participants about barriers to exercise, I focused questions on the facilitators and motivators to exercise.

Facilitators to Physical Activity

Research question 3 was related to perceived facilitators to physical activity. Participants were asked what factors influenced their decision to exercise. Recurrent themes included exercising to be healthier and stronger, body image and weight control, avoiding secondary health conditions, and having more independence. Table 4 shows the themes and associated codes related to facilitators to physical activity.

Table 4

Themes Related to Facilitators to Physical Activity

Theme	Codes associated	# of responses
Healthier and stronger	Avoid losing muscle tone/ existing strength	4
	Stress reliever and mood enhancer	1
	Mental and physical well-being	4
Body image and weight	Desire to lose weight	3
	Keep from gaining weight	1
	Improve physical appearance	3
Avoid secondary health conditions	Awareness of secondary health conditions	3
	Avoid pressure sores	2
	Avoid diabetes	1
Have more independence	Avoid reliance on caregivers	1
	Not burden significant others	3

Themes

Healthier and Stronger

Overwhelmingly participants mentioned wanting to be healthier and stronger as reasons for exercising. Participant 2 expressed concern about losing existing muscle:

> Exercise is really important because my muscles are shrinking, so any movement I do or exercise I do will really help me keep from losing what I have.

For Participant 3, exercising prior to her injury was a stress reliever and improved her mood, even when she was having a bad day:

I want to feel better, to feel the adrenaline rush again, those endorphins that come from working out.

Several participants also mentioned how quickly they lose strength and muscle tone when they go several days without exercise. Participant 6 said:

> I am always trying to do something other than resting in bed. Some days you have those days you want to stay in bed, but you gotta stay up because you can lose it so quickly. Lose it like that.

Participant 4 explained how quickly she regresses in her abilities if she misses a few days of exercising:

> I will tell you if I don't do what I do for a few days in a row, I can't do it. For example, breathing. I do breathing exercises and I use a spirometer and you blow into it to clear your lungs. On average I can handle 2500 on the scale of 3000. If I don't do it for a few days I can't get up to 1500. It's not a question of if I want to exercise, or if it's a choice, it is something I have to do to be able to do day-to-day functions. Atrophy happens very quickly.

Body Image and Weight

While most participants mentioned wanting to be healthier as the main reason for exercising, several participants specifically discussed wanting to improve their body image, as well as not being content with their current weight. Physical appearance, as well as the limitations related to carrying excess weight was mentioned.

Participant 1 described learning how his waist size increased since being in a wheelchair, despite not gaining weight:

> Most people in wheelchairs have a potbelly and it's not related to what they eat, but it is related to sitting and the way the organs displace themselves. I wore a 32-inch waist in jeans at the time of the accident. I was looking at some adaptive clothing and my wife measured my waist and it was 41 inches. I was ready to scream because I only weigh 171 pounds and I have a 41-inch waist.

Participant 7 said that a big motivator for working out is weight control:

> I am dissatisfied with my weight…You don't see a lot of old fat people. If you wanna live longer you need to be leaner. That's the nature of the way things work. So I look at, I have young children so I want to be around as long as I can obviously.

Participant 4 recently underwent cancer treatment, and while she continued to exercise throughout her treatment, she noticed changes in her weight:

> As much as I would like to say my physical appearance doesn't represent me, it really does…To be honest, I am in the midst of an identity crisis. I have gained weight. I can't move like I used to. I don't look like I used to. I can't do the job I used to. It's very scary for me to feel like I am not the person I was before.

Participant 3 described a recent revelation she had while watching a television show featuring another person with an SCI where he effortlessly transferred from his wheelchair to a nearby chair.

> It was like someone had slapped me in the face because I thought, well there you go dumb ass, excuse me, but if you drop this weight-and it's a significant amount of weight I need to lose-I could be able to do so many more things. It was literally like someone slapped me. So now I am thinking how many repetitions of bicep curls or lap pull downs am I am going to have to do with the bands in order to get my heart rate up. Is it even possible? These are the things going through my mind.

Participant 3 also mentioned that another factor that encourages her to exercise is how her wheelchair was designed for her specific body so if she gains more weight she will not be able to fit in her wheelchair:

> This chair was made specifically for my body. The size of it, the wheels, everything. The way my forearms sit on the armrest, from my hips to my knees to my ankles. Everything was measured proportionally for my body.

Avoiding Secondary Health Conditions

Preventing secondary health conditions, specifically diabetes, pressure sores, and obesity were mentioned by several participants as factors that encouraged them to exercise. Participant 8 said:

> Secondary health conditions are huge right now with diabetes and obesity. It's real easy, and I know from experience, it is real easy to sit at home…It's very easy to stay at home, eat, and say woe is me.

Several participants mentioned wanting to avoid getting pressure sores as a reason for exercising. Participant 5 explained the importance of weight shifts:

> We do weight shifts to avoid pressure sores, which is basically getting off your butt for an entire minute…It takes a lot of strength to do weight shifts but it keeps you from getting pressure sores. And if you don't have strength you are not going to do it. I do it mostly to keep my strength up.

Participant 3 described her emotions after she learned the surgery left her paralyzed and at risk for secondary health conditions. She said:

> When you realize you are paralyzed you start reading about it and you find out all these diseases you are headed for. The list is scary…I have always eaten healthy but being in a chair also brings depression, and for me I have always handled that with food and sweets. I don't have diabetes luckily enough, but that's a big fear I have.

Have More Independence

One of the greatest motivators for exercising mentioned by participants was gaining independence and being able to perform everyday activities without assistance. Participant 3 detailed the struggle she experiences by having to rely on assistance:

> The main thing for me is to get the providers the hell out of my house. I really, truly want to have a life again. I know I am not going to have the same life I had before, and I understand that completely but I want my apartment to be my apartment and for me not to be stuck that I have to have strangers-I have strangers in my home every single day, every day…I want to have some sense of independence back.

Several of the participants who are married or in relationships mentioned not wanting to burden their significant other with helping them do everyday tasks. Participant 5 said:

> My wife motivated me to learn how to do things I wasn't able to do previously…So a lot of the things I can do now I do based on the fact that I don't want to see her struggle trying to take care of a grown man…and it goes back to the way I think. I want to get up and do it…I refuse to fall out of my chair and wait 3, 4, or 10 hours for someone to come help me. I might as well learn to get up myself.

Participant 5 also gave an example of how he often encountered people who want to help him by holding the door; however, performing daily activities without assistance is important:

> I hate when people hold doors for me because that's my way of exercise. If the door is heavy I use my strength to get in and out of places and that allows me to get a workout. And people always want to help. I am appreciative but at the same time I like to be able to do for myself. My whole thing is if you aren't there I would have to do it myself anyway.

Participant 4 also mentioned not wanting to have to rely on others. She said:

> And I don't like other people having to do for me so in order for me to be able to not need help, I have to take care of myself and do for myself. I don't want to be a burden to anyone ever. That's one of my hugest motivators. I don't want people doing for me.

Several of the participants' answers to the facilitators and barriers to physical activity led into the questions about the influence of the natural and social environment.

Role of the Natural and Social Environment

Research question four was with regard to the role the natural and social environment had on the participants' level of physical activity. Participants were asked how the physical environment where they lived impacted their experiences with physical activity. Additionally, participants were asked questions about the social environment, including what motivates them to participate in physical activity and how other people in their life impact their experiences with physical activity. Themes that emerged related to the natural and social environment included the support of family and friends, the availability of SCI-support resources, and the impact of limited or no accessible resources on exercise. Table 5 describes the themes and associated codes related to the natural and social environment.

Table 5

Themes Related to the Natural and Social Environment

Theme	Codes associated	# of responses
Support of friends and family	Family motivation	5
	Importance of friendships	3
	Interactions with peers with SCI	6
Availability of SCI support resources	Lack of specialized gyms in area	2
	No accessible sidewalks/ramps	2
	Access to SCI outreach programs	3
	Availability of specialized gyms in area	2

Themes

Support of Friends and Family

Every participant, except for one, mentioned friends and family as a motivator and encourager for physical activity. Participant 2 spoke about the encouraging words her parents and extended family give her during exercise. She said:

> My friends and family encourage me to keep doing everything I can do, every little thing that I can do they say will help me. They say if you exercise more with your legs, or if you do this or do that everything will be better.

Three participants specifically mentioned that having wives who are physically active encourages them to also be physically active. Participant 7 said:

> My wife is very active and has always been prior to us getting married. So in that respect it is some motivation. On occasion it does give us the opportunity to get out and do things together which is certainly enjoyable.

Participant 8 works out regularly with his wife and he started a para-triathlete club where athletes in wheelchairs work out with athletes without injuries. He said:

> I feel like I have surrounded myself with people who are very positive like the triathlon club, my wife, and friends in wheelchairs, they are all very active. I think that's helpful because if you are around someone who says 'oh, you are going to work out again?' [using an exasperated voice and emphasizing the word again] that can be a big downer. So I think if people can surround themselves with more positive people that is a huge help.

Participant 8 mentioned that being a part of a club is also helpful for exercise consistency:

> Being a part of the club is really good. It's nice to have other folks in chairs and we are doing the same thing. If we set up something and someone is going to meet me I am going to be there…Who you surround yourself with is a huge influencer on if you are going to be physically active because if you have positive people around you who want to help you figure things out you can get it done. But if people aren't into physical activity or if they are negative about it, then you won't figure out what's out there.

Participant 1 also exercises with other people who have an SCI and explained how the shared circumstances of using a wheelchair is a way to encourage each other:

> I look at the other people who put out an effort and even if I am not seeing progress, the fact they want to put out an effort means I need to put out an effort for myself, and them. And also we are going to bust each other's chops. Nobody else can give us a hard time; they pity us. So we have to do it to each other. Exercising is the only time we get to do the normal kind of encouraging while exercising.

Similarly, Participant 4 teaches movement classes to people with all levels of ability and specifically talked about how the students in the dance classes she teaches are a motivator.

> My students are probably a big motivator as well and the people I work with. Um, I think people tell me I am an inspiration. I hate that word. I like motivator better. But I feel like I owe it to people to keep doing as much as I can, so that they can as well.

Even for the one participant who did not mention friends and family as a motivator, she discussed the importance of a support system and the feelings of loneliness that result from not having a support system. Participant 3 said:

> I think the support system the patient has is one hundred percent helpful. Me having no support system at all it deadens the soul a bit.

Availability of SCI Support Resources

Four of the eight interviews were with participants who resided in the Atlanta, GA area. Atlanta is home to The Shepherd Center, one of the top rehabilitation centers in the country. Additionally, the metro Atlanta area has a Project Walk, which is an SCI

rehabilitation facility. The four participants from the Atlanta, GA area had a connection to either one or both of these facilities and mentioned them specifically when asked about the impact of the physical environment on their exercise. Two participants moved to the Atlanta area after their injury, in part to have access to The Shepherd Center resources, including adaptive gyms, recreational clubs, and support groups. Participant 8 has remained connected to The Shepherd Center even 5 years after his injury, exercising at their facility as well as speaking with others who have an SCI:

> I love going back to Shepherd and talking to patients about being physically active. Some people don't know they can be physically active after being injured…So I guess my own goal is to get people knowing about physical activity and disability and showing them you can do it.

As participants discussed either the availability or the lack of SCI resources, they mentioned the impact the city or town where they resided had on their level of physical activity. Not surprisingly, the participants who lived in smaller cities mentioned the limitations to physical activity that resulted from their physical environment. Smaller cities offered fewer resources. Participants mentioned the lack of accessible sidewalks and ramps and accessible gyms, as well as having to go out of town for routine doctor appointments, including dentist appointments. Participant 2 resides in a smaller city on the border of South Texas. She said:

> Whenever I see a Project Walk or another place like that for disabled people I think we don't have anything like that here. Nothing, nothing…There should be more places that are specialized for disabled people.

Participant 3 mentioned that even her doctors in nearby Houston, TX were frustrated with the lack of services in the city where she lived. She travels to Houston for her doctor visits because doctors' offices in her city were not accessible:

> She [doctor] put her head in her hands in frustration. She couldn't believe the lack of help here in the city.

In addition to the lack of available resources, such as accessible gyms or other facilities, Participant 3 also commented on the condition of the sidewalks in her city and the lack of ramps.

> [Getting my own groceries] in itself would be great physical activity, if there were smoother ways to get there. My wheels on my wheelchair are already bald. The thread is gone. It's horrible… Even to get into my front door in my apartment with the ramps the apartment put in they are not to spec so I have to get all the way up my patio fence and start hauling ass to get up the ramp to get into my apartment. So yeah it's horrible to get across the street. When you run over rocks it can stop you or push you forwards and it takes a toll on your wheelchair.

Discrepant Data

Barriers to Physical Activity

Much of the literature concerning barriers to exercise includes discussions regarding lack of transportation as a limitation (Hwang et al., 2009; Rimmer et al., 2004; Whiteneck et al., 2004). However, for most of the participants in this study, transportation was not a barrier. Six of the eight participants were able to drive themselves with adaptive hand controls for their vehicle. Given this, transportation was

not a limiting factor for exercise for most participants. Still, Participant 2 and Participant 3 specifically acknowledged transportation as a barrier to exercise. Participant 3 said:

> Lack of access to and from is a barrier. If I were able to go the gym I used to go to [before the accident] and find machines I could use for instance, I would have trouble getting to and from that gym. There is a bus that will pick you up if you qualify to use it that has a wheelchair ramp, but the one time I went to use it they wouldn't pick me up…so I had to get a friend come and pick me up.

Similarly before Participant 6 started driving he mentioned the dependence on others for transportation as a challenge. He said:

> I had to depend on people, and people would say they were willing to pick me up at 7:30 but they wouldn't show up or have the courtesy to call. That was a barrier. But now I can drive and there is nothing that can stop me.

Quality of Life

Throughout the interviews, participants reflected on their life circumstances following their injury. For some of the participants who have had their injury longer, they were more accepting of their situation, even while still acknowledging the barriers, although that was not always the case. Participant 1 who has had an SCI for 9 years said:

> Relatively speaking, I am a cripple in a wheelchair, but I am better off than many people. I can afford to go to therapy, and I can eat and we have our house. I still have my house even when my health went away.

Participant 3's injury occurred 2 years ago and she acknowledged that with her injury being so new, there are still a lot of emotions she is working through as she learns to adapt to her disability. She said:

> It's a helpless feeling. I spent all these years taking such good care of myself…The frustration that I have now at not being able to work out the way I need to adds to that anger and uh, depression and frustration, all the emotions. It adds a lot of negativity to my life…I honestly thought when I came home from the hospital I would go back to work and everything would be the same, except being in a wheelchair. And I was so completely wrong about that, completely wrong.

Participant 6 has had his injury for around 8 years and when asked if he is content with his current level of physical activity he said:

> I push every day. I pray every day to get out of this chair, but by the same token I am glad I was chosen to be in this chair because of my spirit and motivation and drive. It is what it is…I was prepared for this. I had lost my father; it prepared me. He prepared me for when I got in this confinement. Life is going to change, you have to know how to adapt and adjust.

While Participant 6 has come to terms with his disability, Participant 5 structures the types of exercise he does and where he receives therapy around his desire to walk again in the future. He explained:

> I am not trying to be in this chair for the rest of my life. I want to get out of the chair…I would like to go to Project Walk but they are not covered by

> insurance…When I can afford it I will go there because their whole philosophy is to get you out of the chair and they continuously work on getting you out of the chair.

Unlike some of the participants who now exercise and train to participate in wheelchair races, Participant 5 does not want to participate in wheelchair-related sports. He said:

> I don't have one desire to do one [wheelchair race] based on the fact that I a runner and I am always a runner and the first thing I want to do is get out of this chair and then the next thing I want to do is run the Peachtree [Road Race].

Evidence of Trustworthiness

Credibility

Credibility refers to whether the findings are credible or believable (Lincoln & Guba, 1985). One technique for credibility is to build trust by investing a significant amount of time learning about the culture (Lincoln & Guba, 1985). One of the ways I built trust was by learning about the disability community and being familiar with what is considered proper terminology and using People First Language, which means putting the person before the disability in order to eliminate dated and hurtful language that was once used to describe people with a disability (Snow, 2001). Another way to improve credibility was that participants were told they could contact me if they thought of any additional information to add to the study. Two participants shared additional information after their interview, including a newspaper article written about them, and videos that showed them exercising. While the information they provided was not added into the

study, I enjoyed reading the article and watching the videos to gain a better understanding about the participants. Participants were also given the opportunity to review their transcripts and ensure that I understood what was said correctly.

Transferability

Transferability refers to the degree that the research is generalizable or able to be transferred to other settings (Lincoln & Guba, 1985). For this study, providing thick descriptions and using direct quotes to assist readers with making decisions enhanced transferability. I also provided a detailed description of the research methods.

Dependability

Dependability ensures that research findings are consistent and can be repeated (Lincoln & Guba, 1985). While the responses would vary if the study was repeated, the study methods could be replicated because I kept detailed records throughout the process. The same steps were used for participant recruitment, qualification criteria, and data collection.

Confirmability

Confirmability refers to the degree to which others can confirm results (Lincoln & Guba, 1985). A strategy to enhance confirmability is to have a researcher who was not involved in the study review the results. For this study, a behavioral scientist reviewed the study results and validated the identified themes and associated codes. Based on her advice, I also added additional detail in the following sections: participant recruitment and pre-screening, individual interviews, and pilot study.

Summary

The participants in this study all acknowledged the importance of physical activity. Satisfaction with their current level of exercise depended in part on the length of time since injured and the availability and accessibility of resources. The participants in the study understood the consequences of not exercising as well as the benefits of being physically active.

Breaking down barriers to exercise would lead to increased physical activity for study participants. In particular, these barriers include reducing the costs or finding funding sources for exercise equipment or specialized gyms. Other barriers mentioned such as the added length of time it takes for exercise are not easily changed, but by reducing other factors that deter exercise, this barrier can be minimized. Similarly, factors that encourage physical activity should be sustained or enhanced. All participants noted the influence and importance of family and friend support. Awareness of the secondary health conditions that may result from lack of physical activity was also a motivating factor for this group to be active.

Chapter 5 covers the following topics: interpretation, theoretical considerations, implications for social change, recommendations and conclusions.

Chapter 5: Discussion, Conclusions, and Recommendations

Introduction

People with disabilities are at increased risk for developing secondary health conditions (Becker, 2006). Preventing secondary health conditions in people with an SCI requires an understanding of the factors that facilitate physical activity as well as barriers to physical activity. A phenomenological method was used to better understand the participants' experiences with physical activity, with an emphasis on what encourages physical activity, what factors prevent or limit exercise, and the role of the social and natural environment. The study was qualitative, using in-person interviews.

Key Findings

I developed interview questions to elicit responses from adults with an SCI about their experiences with physical activity, facilitators to exercise, barriers to exercise, and the influence of the social and natural environment on physical activity. Themes that emerged from overall exercise experiences showed that the participants were self-motivated, considered exercise as a lifestyle, and recognized the importance of physical activity, despite the frustrations that accompanied exercising with an SCI.

Participants identified a range of both facilitators and barriers to physical activity. Participants mentioned barriers to exercise including the financial cost, the added time and energy expenditure, the assistance needed during exercise, and embarrassment and unwanted attention during exercise. Themes that developed from facilitators to exercise included the desire to be healthier and stronger, to improve body image and weight, to avoid secondary health conditions, and to be more independent. Participants were also

asked how the natural and social environment impacted exercise and the two themes that emerged included the support of friends and family and the availability of SCI-support resources.

Interpretation of the Findings

This study added to the body of knowledge around physical activity for people with an SCI by reporting the exeriences, barriers, facilitiators, and role of the natural and social environment from the viewpoint of the participants. Using the phenomenological approach, participants had the opportunity to describe their experiences with physical activity. While discussing these experiences, the participants shared factors that encouraged physical activity and discourged participation. The social and natural environment also played a significant role in the participants' exercise experiences, which is detailed in the in-depth interviews with the participants.

All participants in this study recognized the benefits to physical activity, despite whether they exercised regularly. This recognition of the importance of physical activity also contributed to the frustration that came from not being able to exercise like they previously did or being able to achieve the same results as they did prior to their injury.

This research study extended the level of detail known with regard to the barriers to physical activity adults with an SCI experience. For instance, many participants provided details on the costs of specialized gyms and rehabilitation facilities and the costs associated with adaptive equipment. Participants explained that insurance was limited or nonexistent for using specialized facilities and that equipment was costly and not easily

available. These costs limited their exercise experiences, despite their desires to be physically active.

This study also extended information about the amount of extra time needed to exercise, as participants shared experiences with the added time required to get dressed for the gym, for transportation to an accessible facility or appropriate outdoor space, and using the adaptive equipment. Along with the added time needed to exercise, participants noted they often needed assistance to perform the exercises. This knowledge is important for health professionals to consider when they develop physical activity programs, as they will need to take into consideration preparation time for exercise, transportation, and the assistance needed even if the equipment is adaptive.

This extended knowledge can be used to create more specific ways to promote exercise for people with an SCI. Even if all the barriers cannot be completely removed, an acknowledgement of them or a way to mitigate some of the costs associated with using adaptive equipment or facilities is needed.

Findings Related to Facilitators and Barriers

Findings in this study related to facilitators and barriers to physical activity among people with physical disabilities were supported by the literature. Specifically Kehn and Kroll (2009), Nosek et al. (2004), Rimmer et al. (2004), and Scelza et al. (2005) described natural environmental barriers such as inaccessible facilities, either by equipment too close to other equipment, nonaccessible locker room facilities, or lack of accessible parking spaces. Similarly, participants in this study noted the barriers to accessing gym facilities, unless they were gyms specifically designed for people with a

physical disability. Study participants explained how gyms lacked accessible shower areas, equipment was too close to each other and therefore inaccessible with a wheelchair, and limited adaptive equipment available was often in disrepair.

Social barriers described in the literature included people feeling self-conscious using mainstream gym facilities (Rimmer et al., 2004). In this study, participants also mentioned feeling embarrassed when exercising or receiving unwanted attention from other people. Goreczny et al. (2011) also discussed the invisible barriers people with disabilities experienced including negative attitudes toward people with the disability. In my study, one participant in particular mentioned that she knew other yoga students were uncomfortable with her attending yoga classes with them. While this did not always stop participants from exercising, social barriers were mentioned as a cause of frustration or a factor that influenced how, when, and where they exercised.

Benefits of regular physical activity including increasing quality of life, energy, self-confidence, and body image were reported in the literature (Cardinal et al., 2004; Hicks et al., 2003; Kehn & Kroll, 2009). The participants in my study also noted the positive benefits to exercise including improved body image, more independence, and feeling stronger and healthier. Specifically, participants mentioned being able to do more daily tasks by themselves when they worked out regularly.

Nosek et al. (2004) examined the relationship between mental health and physical health as participants said that participating in physical activity reduced their stress level. In my study, several participants mentioned that they exercised to reduce their stress level

and that it helped them avoid depression, which they acknowledged was more common for people with an SCI.

Kehn and Kroll (2009) found that motivation was a major factor in determining physical activity level. In my study, participants noted their self-motivation as a reason for being physically active. Despite physical limitations, participants stated that they had always been self-motivated and that their motivation did not change following their injury.

Research has shown that people with an SCI are at increased risk for secondary health conditions including diabetes and heart disease, and these conditions may appear at an earlier age compared to people without an SCI (Hicks et al., 2003; Manns & May, 2007). Participants in my study were also aware of secondary health conditions related to a lack of physical activity and specifically mentioned that they wanted to be physically active in order to avoid developing secondary health conditions. Participants mentioned diabetes and obesity as conditions they wanted to avoid and as a reason for exercising. Manns and May (2007) found that education about secondary health conditions was most often provided to people with an SCI during their initial rehabilitation following injury. This timing is problematic, however, because people with a new SCI may not yet understand the importance of avoiding secondary health conditions (Manns & May, 2007). Several participants in my study noted this as well and mentioned that they would have preferred to receive more guidance on avoiding secondary health conditions, nutrition, and exercise, after their initial rehabilitation.

Disconfirmed Findings

A review of the literature suggested that transportation was a major barrier to physical activity (Hwang et al., 2009; Rimmer et al., 2004; Whiteneck et al. 2004), with the exception of one study by Scelza et al. (2005) that did not find transportation to be a major barrier. Surprisingly, in my study, transportation was not an issue for most participants. While two participants did not drive, only one mentioned it as a barrier. The other participant had a strong family support system so transportation was not an issue. Scelza et al. speculated that the reason transportation was not a major issue was because participants lived in an affluent region with existing community resources. In my study, the strong family and friend support systems along with adaptive driving equipment made transportation less of an issue.

Spivock et al. (2008) examined the natural environment as it related to physical activity by studying environmental buoys, which are elements of the environment that support a person's activities. Buoys can include walking surfaces, adapted signage, and accessible areas. Not surprisingly, that study found that people who lived in neighborhoods with active buoys reported more involvement in leisure and physical activities. While one participant in my study discussed his flat neighborhood and how it allowed him to wheel around, the majority of the participants did not have environmental buoys, yet most were still active. Even two of the most physically active participants from this study mentioned that their neighborhoods were not accessible for exercise, either because of steep hills that would make wheeling dangerous or because of traffic and their worry of not being visible to drivers. Two other participants mentioned uneven

sidewalks were causing the wheels on their wheelchair to deteriorate. In this study, participants participated in physical activity even without active buoys.

Theoretical and Contextual Interpretations

Theory of Planned Behavior

In the theory of planned behavior, a person's intentions and behaviors are based on three determinants, which include those personal in nature, those reflecting social influence, and those dealing with control issues (Ajzen, 2005). The constructs of the theory of planned behavior were affirmed in this particular study, and the results are as follows.

Personal determinants refer to a person's attitudes toward the behavior. The person's attitude is either positive or negative to performing the behavior (Ajzen, 2005). Overwhelmingly, the study participants spoke positively about exercise and the benefits that resulted from getting physical activity, such as feeling stronger, healthier, and more independent. While participants expressed frustration with barriers that either prevented physical activity or made it more challenging, many mentioned the satisfaction and positive feelings that came once they exercised.

Another determinent of intention is the person's perceptions of the social support to either perform or not perform the behavior by people significant to them (Ajzen, 2005). Every participant mentioned family and friends as motivating factors to exercise, with the exception of one participant. Yet, even for that participant who explained that she did not have a support system, she still recognized how important the support of friends and family was to maintaining good health. The third determinant relates to

perceived behavior control and the ability of the person to perform the behavior (Ajzen, 2005). The participants noted physical barriers that prevented them from exercising, such as inaccessible facilties, but also the satisfaction that resulted from working around the barriers and accomplishing their physical activity goals.

Intention is one of the constructs of the theory of planned behavior and is often used for examining determinants of physical activity. The theory of planned behavior was an appropriate choice to use for this study because it helped me examine the determinants of physical activity among the participants. According to the theory of planned behavior, people's health-related behavior is based on their intention to perform a particular behavior, in this case, physical activity. The intention to perform this behavior is influenced by several factors. In answering questions, the participants described how their participation in physical activity is influenced by attitudes, either positive or negative; the belief about what others think of the behavior, such as friends and family as well as strangers they encounter while exercising; and perceived behavioral control, including the degree to which they believe the behavior is within their control. In my study, the more positive the participants' attitudes were about physical activity, the more likely they were to exercise. The participants with more positive attitudes to physical activity were also less likely to let social and natural environmental barriers keep them from exercising. For those participants who did not have as positive of an attitude, they were more likely to let barriers prevent or limit them from exercising compared to the participants with a more positive outlook on physical activity.

The attitudes of others also influenced participants' experiences with physical activity. For instance, several participants said family members and friends encouraged them to exercise and cheered them on. Other participants provided examples of exercising with other people with an SCI at specialized gyms or during wheelchair races and motivating each other to work harder. Yet, even for the participants who found friends and family members' positive attitudes as an encouraging factor to exercise, they also acknowledged experiencing negative attitudes to exercise. Participants shared examples of comments and stares from strangers that influenced where and when they exercised.

The belief that achieving physical activity was within their control varied by each participant, with most finding ways to work around obstacles. Several participants mentioned that they were even motivated to find ways to overcome the obstacles and do something that others thought was not possible to achieve. However, for a few of the participants, the componding barriers such as cost, transportation, availability of accessible equipment, and physical limitations kept them from exercising, despite their desire to be active.

Limitations of the Study

This study had several limitations. Study participants were volunteers and therefore may have chosen to participate because of their interest in physical activity. Selection bias implies that a participant's self-selection in the study may contribute to an inaccurate representation of the population being studied (Krishna, Maithreyi, & Surapaneni, 2010). Of the eight participants interviewed in this study, six participants

described their level of physical activity prior to injury to be very active. Given that, the findings from this study may not be typical or representative of the experiences others with an SCI face.

Initially, this study was limited to adults living in the Atlanta, GA area. However, the study criteria were eventually expanded to include participants living anywhere in the United States. Still, the recruitment measures were primarily focused in the Atlanta, GA area. One recruiter shared the recruitment information electronically as well as handed out recruitment flyers in the Atlanta, GA area. Given that the recruitment flyers were only handed out in the Atlanta, GA area, the recruitment information was shared more often in Georgia than in other areas across the United States. However, some people living in other states were on the email listservs that received the recruitment information. In at least one case a participant who did not reside in the Atlanta, GA area told me that she learned about the study from a hospital worker who had received the recruitment information. The other recruiter who shared information sent the study information to a listserv that included friends and family members who in some way supported The Shepherd Center. Since the Shepherd Center is located in Atlanta, people living in that area had a greater likelihood of learning about the study. However, by the time the second recruiter shared the information, only two participants were needed to complete the interview process.

The findings represented information obtained from a small group of participants about their physical activity experiences since developing an SCI within a specific timeframe. The analysis, while focused, was subjective and the results from this study

may not be generalizable. While the small sample size was appropriate to allow me to gain in-depth knowledge from participants, it does not allow for data to be generalized.

With regard to trustworthiness, I used the same interview guide (see Appendix A) with all participants. That is, all participants were asked the same questions, although sometimes the questions were asked in a different order depending on how the conversation was flowing. Interviews were transcribed and sent to participants for review. No changes were made based on these reviews. Transcripts are maintained in paper and digital forms securely for future use, if needed. Audio recordings of each interview are also stored in a locked filing cabinet.

The results from this study cannot be generalized to other populations. However, the study findings can be used as a starting point for other research on physical activity barriers and facilitators among adults with SCI. The interview data were collected, coded, and analyzed in such a way that other researchers could follow the research process used in the study to determine how the conclusions were reached.

Responses to the study would vary if repeated with other participants; however, the methods could be replicated because the same steps were taken with each participant for recruitment, qualification, and data collection.

Recommendations

Additional quantitative and qualitative studies could be done with adults with an SCI to continue to explore the facilitators and barriers to physical activity. For the purposes of this study, recruitment was limited to adults who have had an SCI for no more than 10 years. A comparison study of the barriers and facilitators for adults who

have had an SCI for longer than 10 years to those with an SCI injury less than 10 years would be interesting to see if differences emerged based on the length of time of injury. Research has also found that men with disabilities exercise more than women with disabilities (Nosek et al., 2006; Santiago & Coyle, 2004; Whiteneck et al., 2004). A study in which women with an SCI were specifically asked about barriers and facilitators to exercise would be another area to pursue in the future. Additionally, in this study, I did not recruit based on age, other than participants being 18 or older, so researchers could conduct a study with adolescents with an SCI and their experiences with exercise or could focus on older adults with an SCI.

A study by Whiteneck et al. (2004) found significant differences in environmental barriers for people with disabilities based on length of time they have been injured and gender. Future studies could examine whether the length of time or gender made a difference in reported barriers specifically for people with an SCI. Also study results may vary if specific geographical locations were selected for the study. A comparison study in which the experiences with exercise of people with an SCI who live in rural areas or urban settings in different locations throughout the United States in would be interesting to determine if differences existed based on location.

Recruitment for this study could be done in a broader way. For example, recruitment information could be shared by attending SCI support group meetings or events. Sharing information at a group session may have allowed me to reach different people who were missed from electronic recruitment methods. The recruitment information also could be shared more broadly on other SCI listservs and social media

channels. Sharing the recruitment information more broadly may have resulted in a more diverse group of participations from different geographical areas of the United States. Differences may be found in the results when the participants are from other areas, instead of primarily from the Atlanta, GA area.

Implications

Positive Social Change

Positive social change improves human and social conditions. By sharing the research findings and applying ideas, strategies, and actions, one can create positive social change (Walden University, n.d.). The implications for positive social change from this research include a better understanding of the experiences people with an SCI have when exercising, and the potential to minimize the barriers to physical activity in an effort to reduce related secondary health conditions.

Understanding the experiences people with an SCI have when exercising, as well as the barriers and facilitators to physical activity, is critical not only for other healthcare professionals, but also for the friends and family members of people with an SCI. Receiving social support for participation in physical activity is a facilitator to exercise. Because people with disabilities experience additional challenges and are at increased risk for secondary health conditions, there is an even greater need for health promotion programs for this group (Becker, 2006). However, developing and implementing physical activity programs for people with disabilities requires an understanding of the specific barriers and facilitators to physical activity. For example, recommendations to walk or take the stairs are not possible fitness options for most people with an SCI. Instead the

recommendations could include hand-cycling, adaptive yoga, or wheeling. Also, because there are a variety of disabilities with different limitations, fitness programs should be tailored for the type of disability. Similarly, understanding the factors that encourage physical activity is critical for healthcare professionals to tailor interventions and programs appropriately (Kehn & Kroll, 2009). The knowledge about barriers and facilitators obtained from this study will be shared with the two people who assisted with recruitment, with the hope that they can find ways to discuss and address these barriers and facilitators in their support group sessions or through their communication with group members, their family and friends, and advocates.

I will also share the study findings with colleagues at CDC where I currently work. My position at CDC provides me the opportunity to connect directly with other public health professionals working in the Division of Human Development and Disability. The Division of Human Development and Disability maintains the content on their Website for state and community leaders who fund and develop fitness programs and recreational spaces in their communities. The website also contains information for physicians on how to communicate about physical activity with patients with disabilities. Research shows that adults with disabilities are 82% more likely to be physically active if their physician recommends exercise (CDC, 2014). For that reason, sharing the results from this study with physicians is important so that they discuss physical activity with their patients and help their patient develop fitness goals that are tailored to their abilities and minimize some of the common barriers. By sharing my research findings I am providing additional knowledge about the topic to public health professionals working in

the field to improve physical activity participation and decrease related secondary health conditions for people with disabilities.

Several of the barriers mentioned by participants were related to the natural environment, such as inaccessible facilities, uneven sidewalks, and the lack of ramps and curb cuts. These barriers prevented or limited participants' use of mainstream gyms. Sharing information about these barriers and ways to overcome the barriers, such as including family changing areas, lower counters at the front desk, and push operated doors are suggested recommendations for gym owners. I plan to share these findings and recommendations with several gyms in the metro Atlanta, GA area.

This research brought greater awareness to the challenges to physical activity among people with an SCI. The research findings provide insight into the lives of people with an SCI as it relates to achieving physical activity. Support group moderators, community leaders, physicians, and public health professionals can use the results from this research when developing physical activity programs and promoting physical activity among this population.

Conclusions

People with an SCI face many obstacles to obtaining physical activity. Even for participants who were motivated and interested in being physically active, the barriers to exercise limited their experiences, either in time spent exercising, the type of exercise, or their overall enjoyment. Often it was not one single factor that encouraged or prevented exericse, but was a combination of factors, such as the cost of using accessible gyms and the embarassment and unwanted attention of exercising at mainstream gyms. Each

participant had diffferent and unique situations that impacted their experiences with physical activity.

All participants were motivated to be physically active; however barriers limited physical activity for some participants more than others. A better understanding of the barriers and social and natural environmental factors that impact exercise is necessary when creating new exercise programs or recommendations. While providing better access and affordable facilities and equipment is essential in improving health promotion programs for this group, equal consideration must be given to the social environment factors that influence physical activity level. Public health professionals and clinicians should give consideration to all of these factors when developing programs and encouraging exercise. It is my hope that the results of this study will be of interest to physicians who have patients with an SCI and public health professionals who work with people with an SCI.

Finding fitness facilities and health programs that provide options to meet the needs of people with an SCI remains a challenge. The study results demonstrated the need for additional fitness programs tailored to the needs of people with an SCI and services, such as accessible and affordable gyms. By removing or lessening the barriers to exercise, along with promoting the facilitating factors, it may enhance the opportunities for physical activity among people with an SCI and reduce the risk for secondary health conditions.

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Appendix A: Interview Questions

Date:

Location:

First Name of Participant:

Interview Number:

1. What type of SCI do you have?
2. How long have you had an SCI?
3. How did your SCI occur?
4. What does physical activity mean to you?
5. Please describe the last time you engaged in physical activity.
    a. What feelings were generated by this experience?
    b. What thoughts stood out to you at the time?
    c. Would you like to add anything related to this experience?
6. How would you describe your level of physical activity?
7. What were your experiences with physical activity prior to developing an SCI?
8. What are your experiences with physical activity since developing an SCI?
9. How would you describe to someone what it is like to have an SCI and engage in physical activity?
10. How does your level of physical activity affect you?

11. What feelings and thoughts stand out the most when thinking of your current experiences with physical activity?
12. How important is physical activity to you?
13. What are the barriers to physical activity that you experience?
14. What helps facilitate physical activity for you?
15. What motivates you to participate in to physical activity?
16. How do other people in your life impact your experiences with physical activity?
17. How does the environment in which you reside impact your experiences with physical activity?
18. Is there anything else you would like to add as it relates to your experiences with physical activity?